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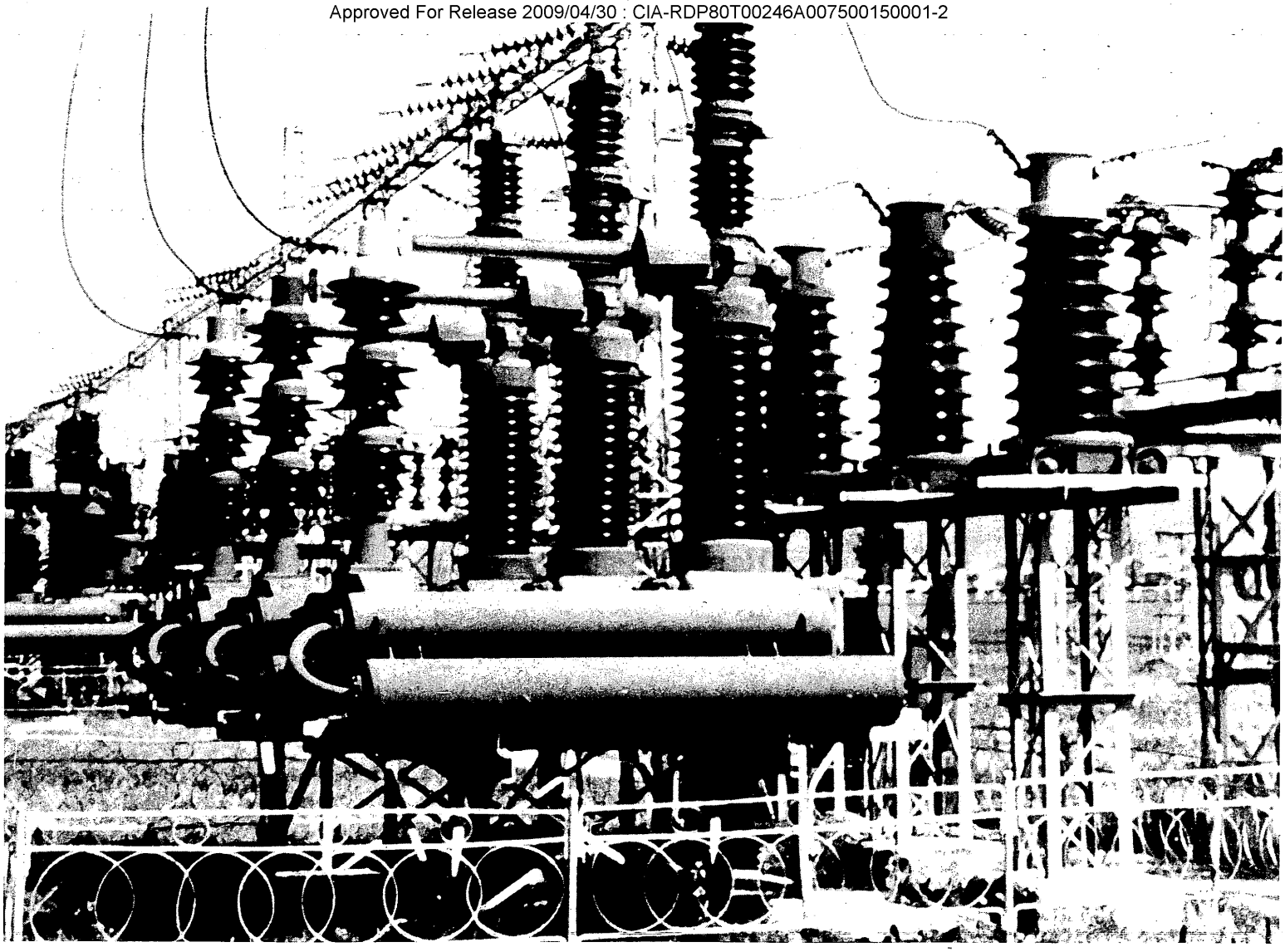

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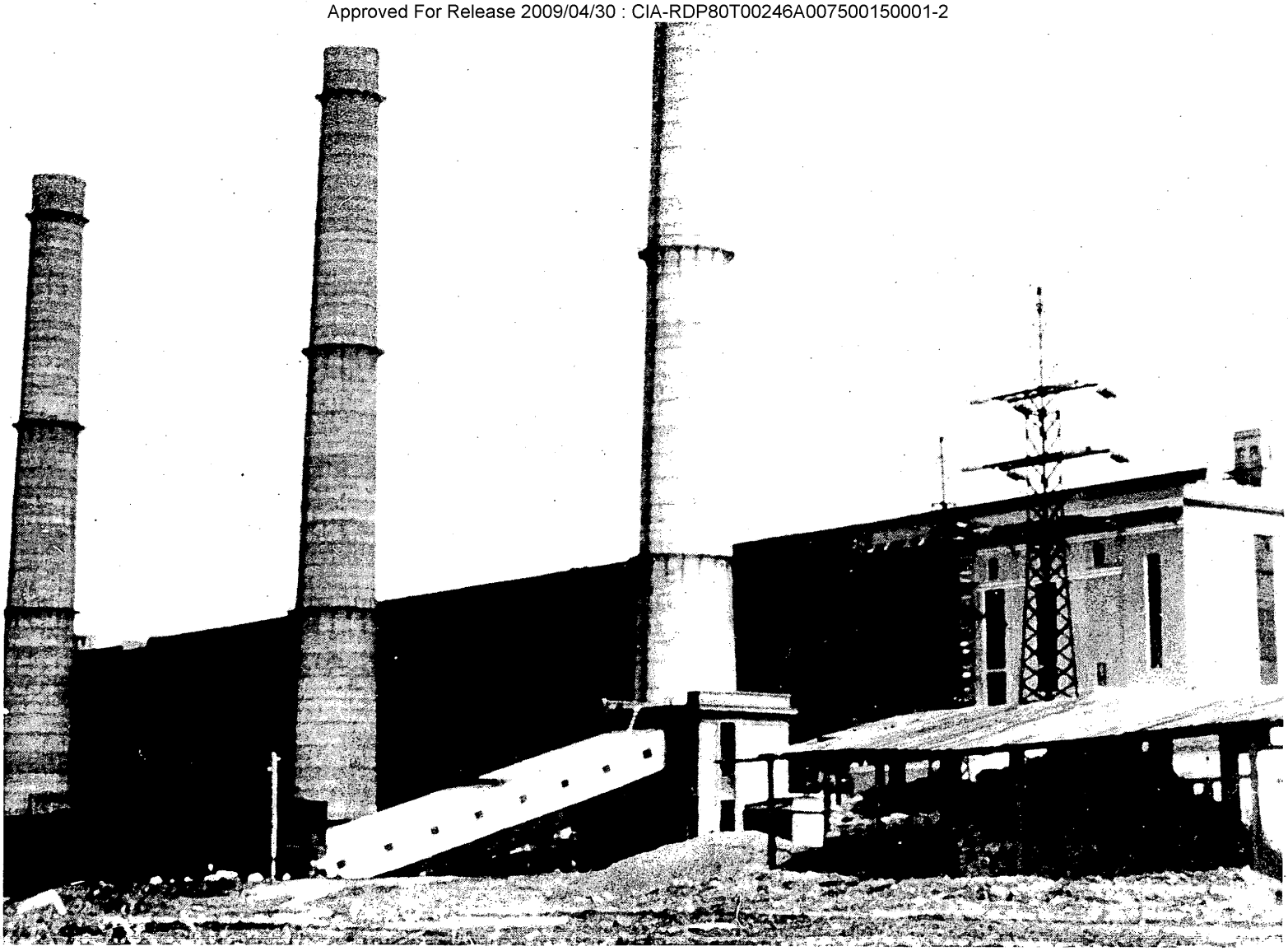

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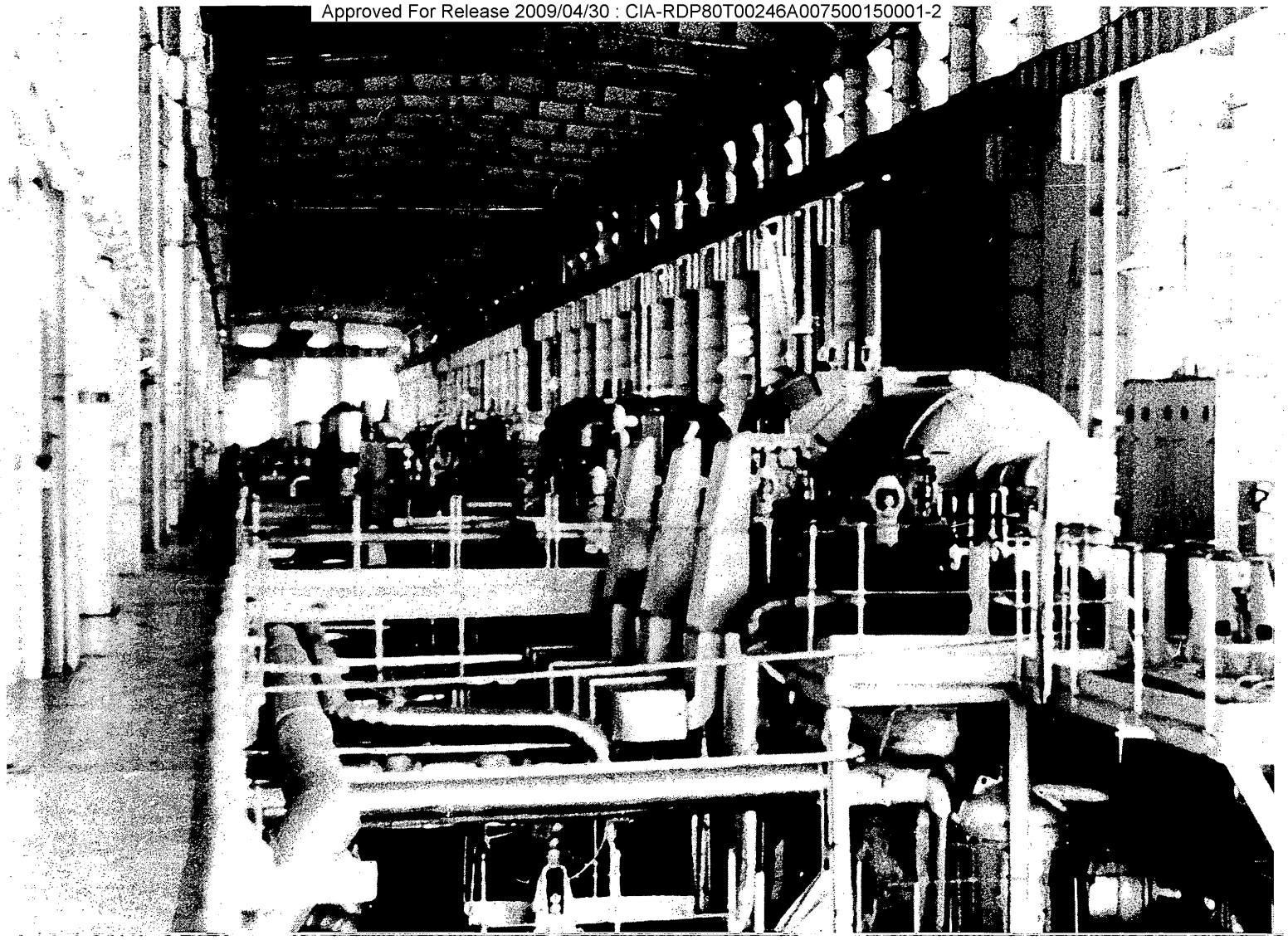

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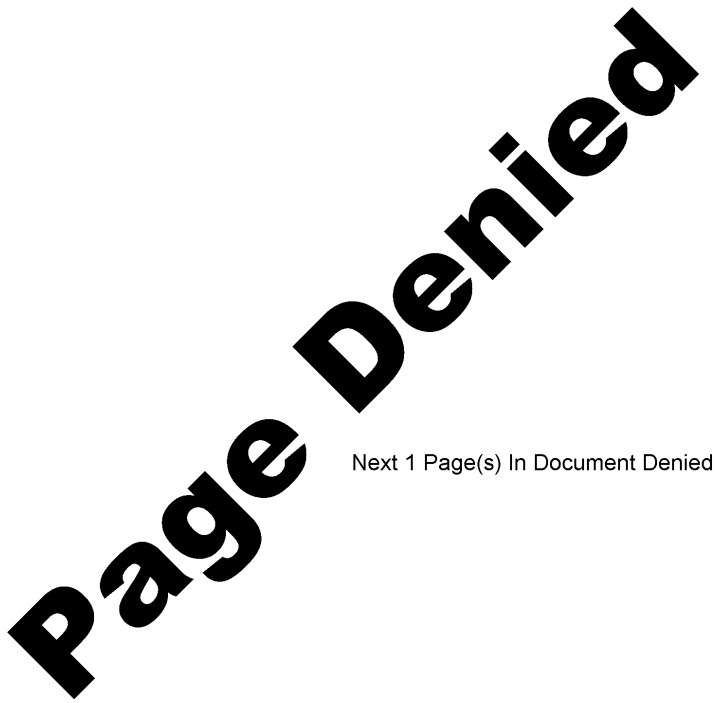

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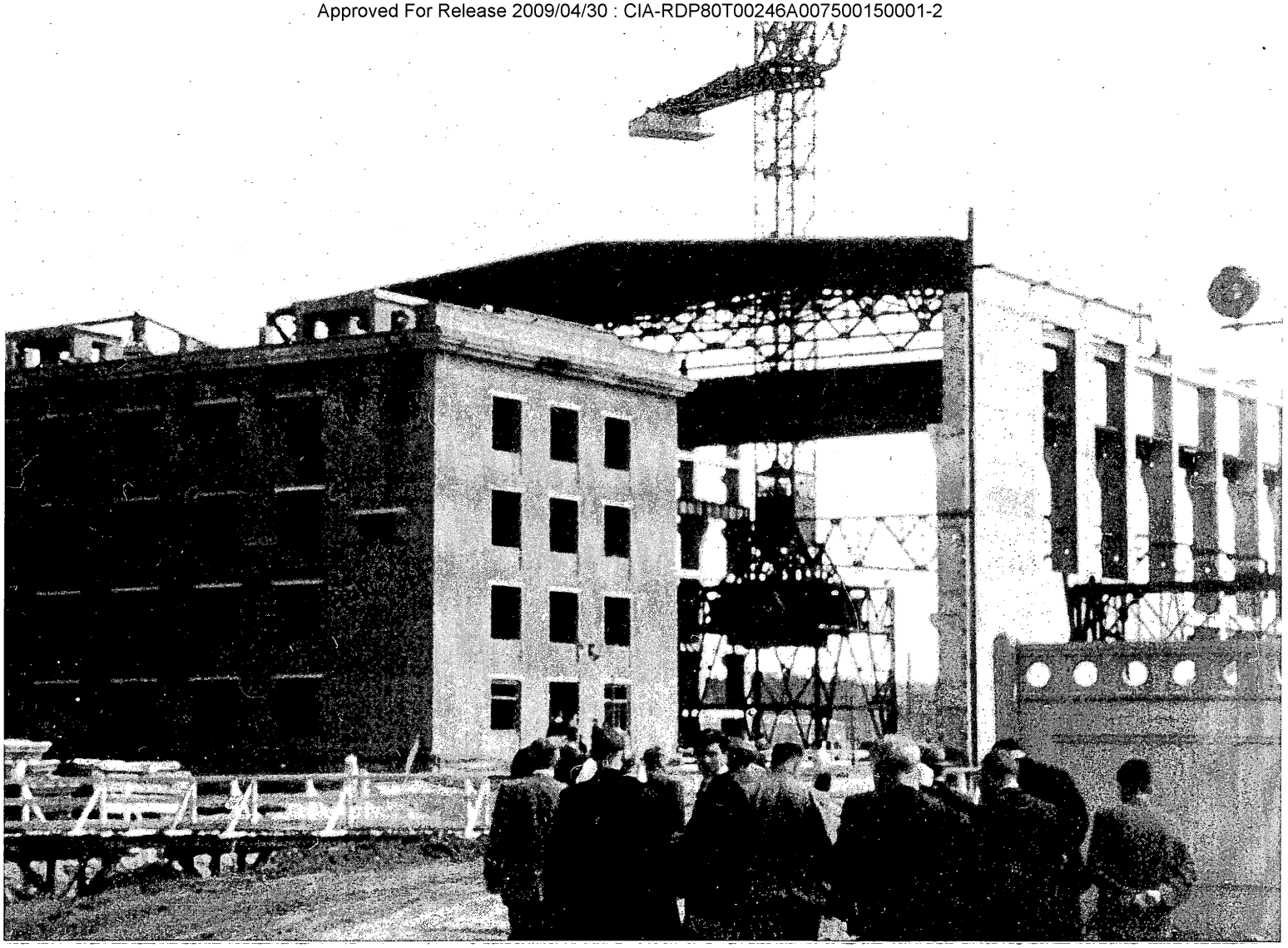

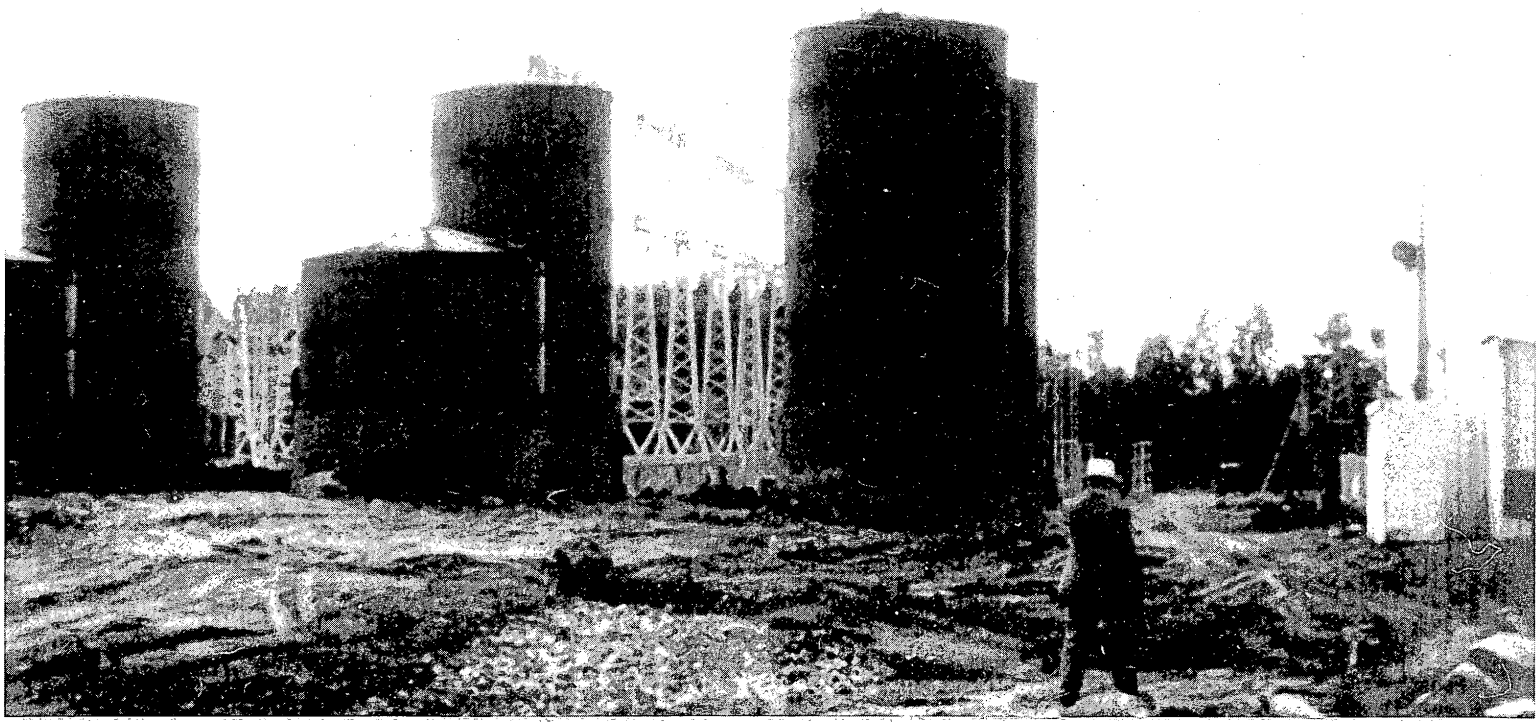

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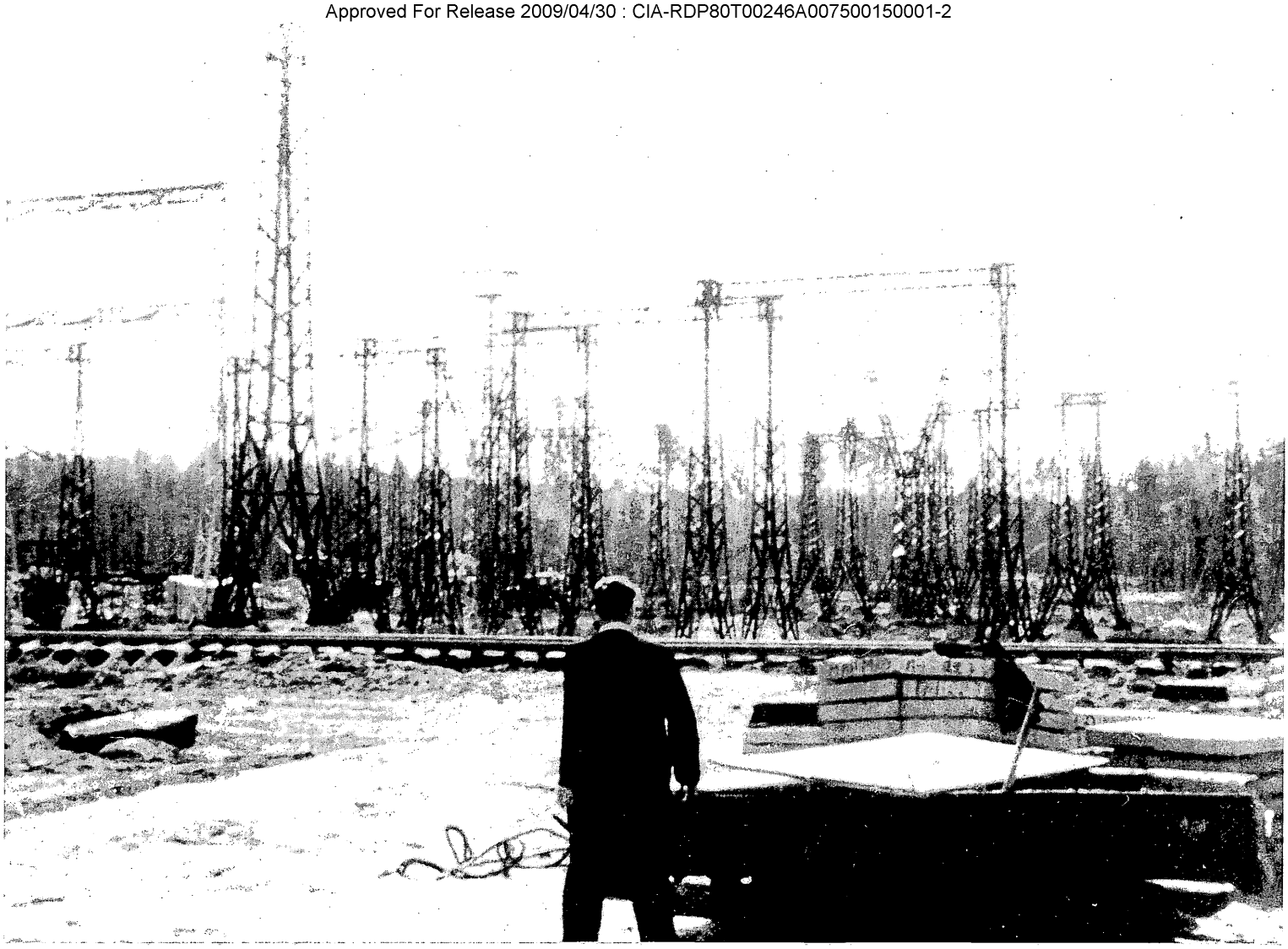

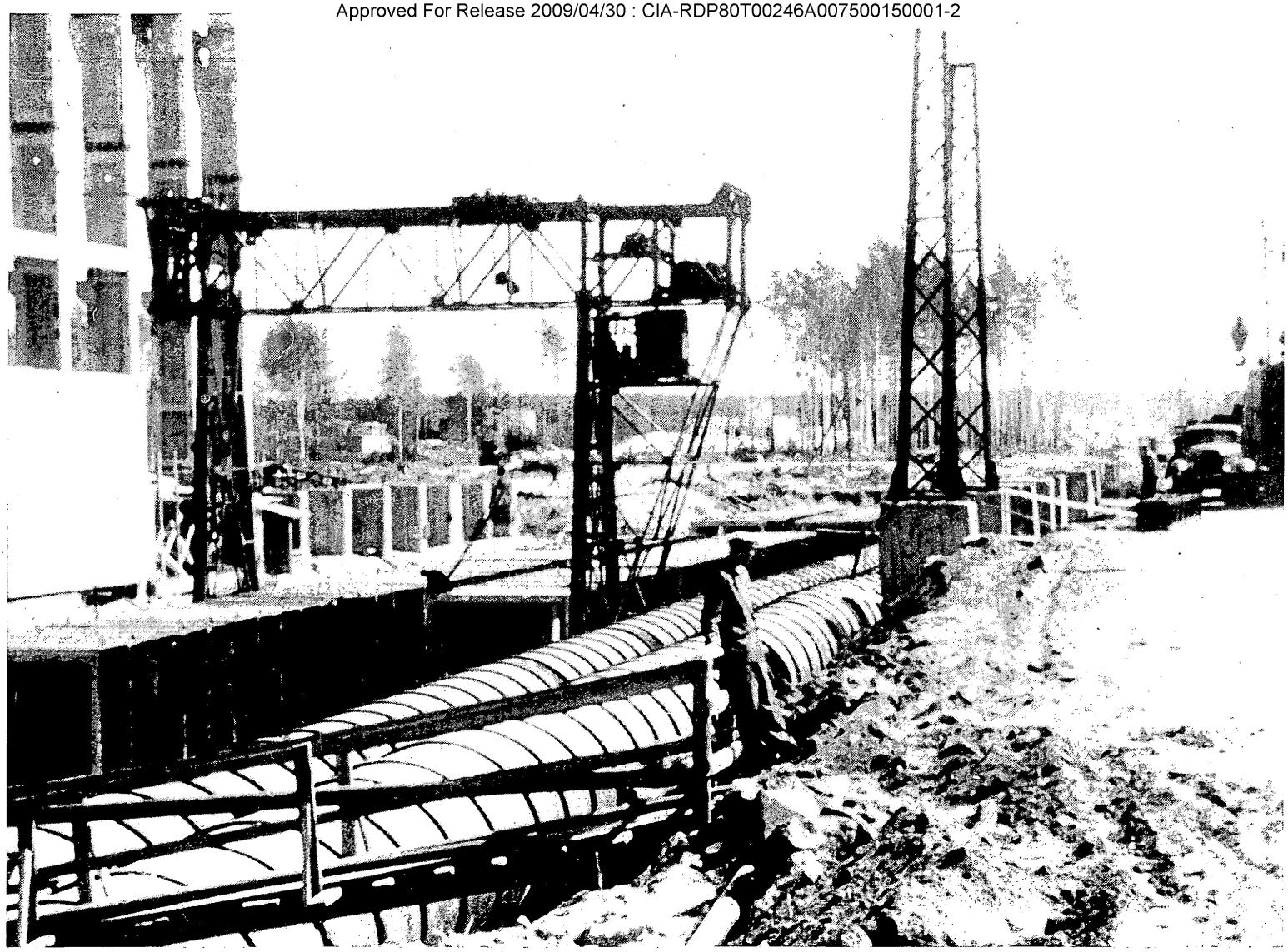

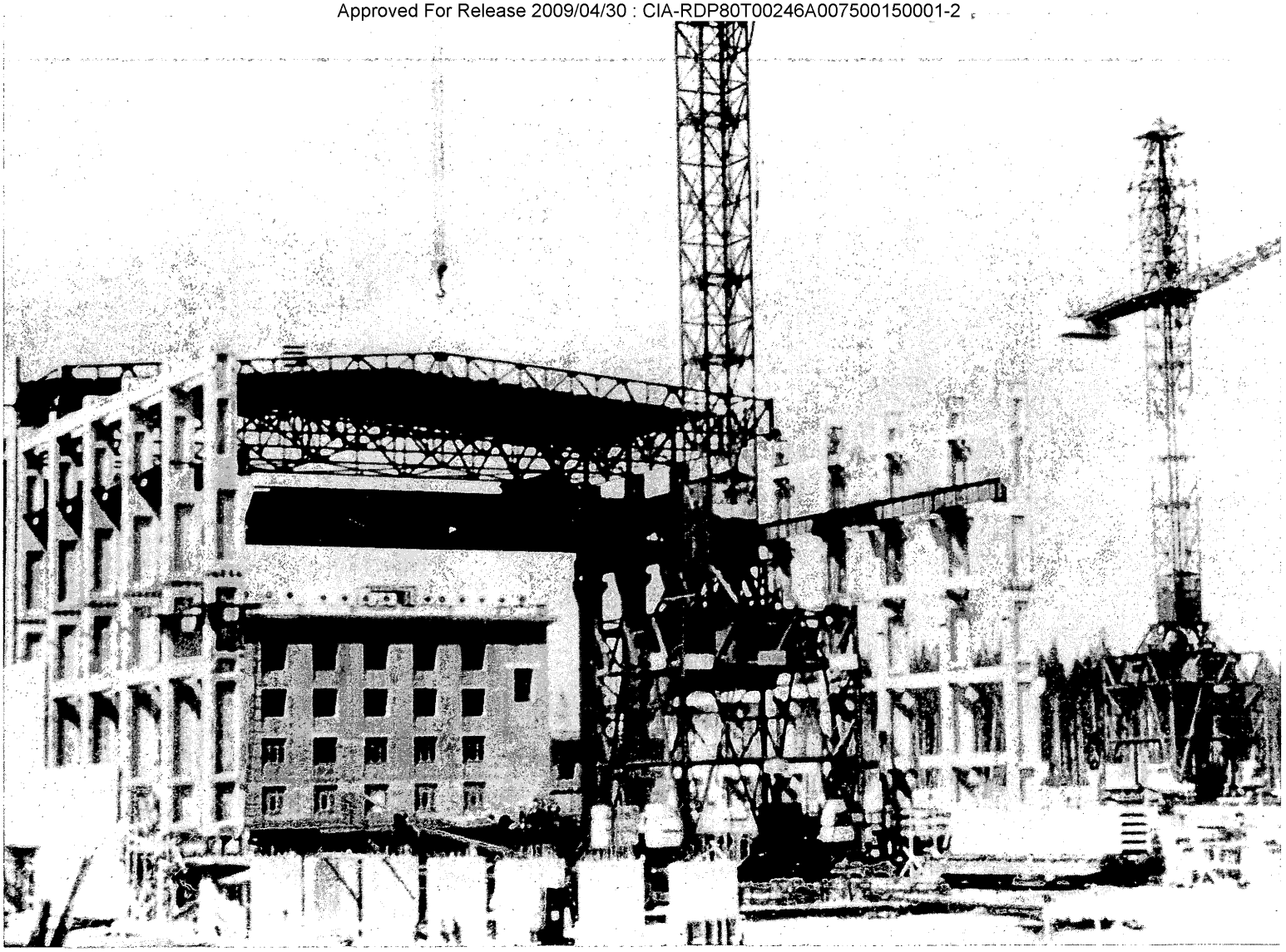

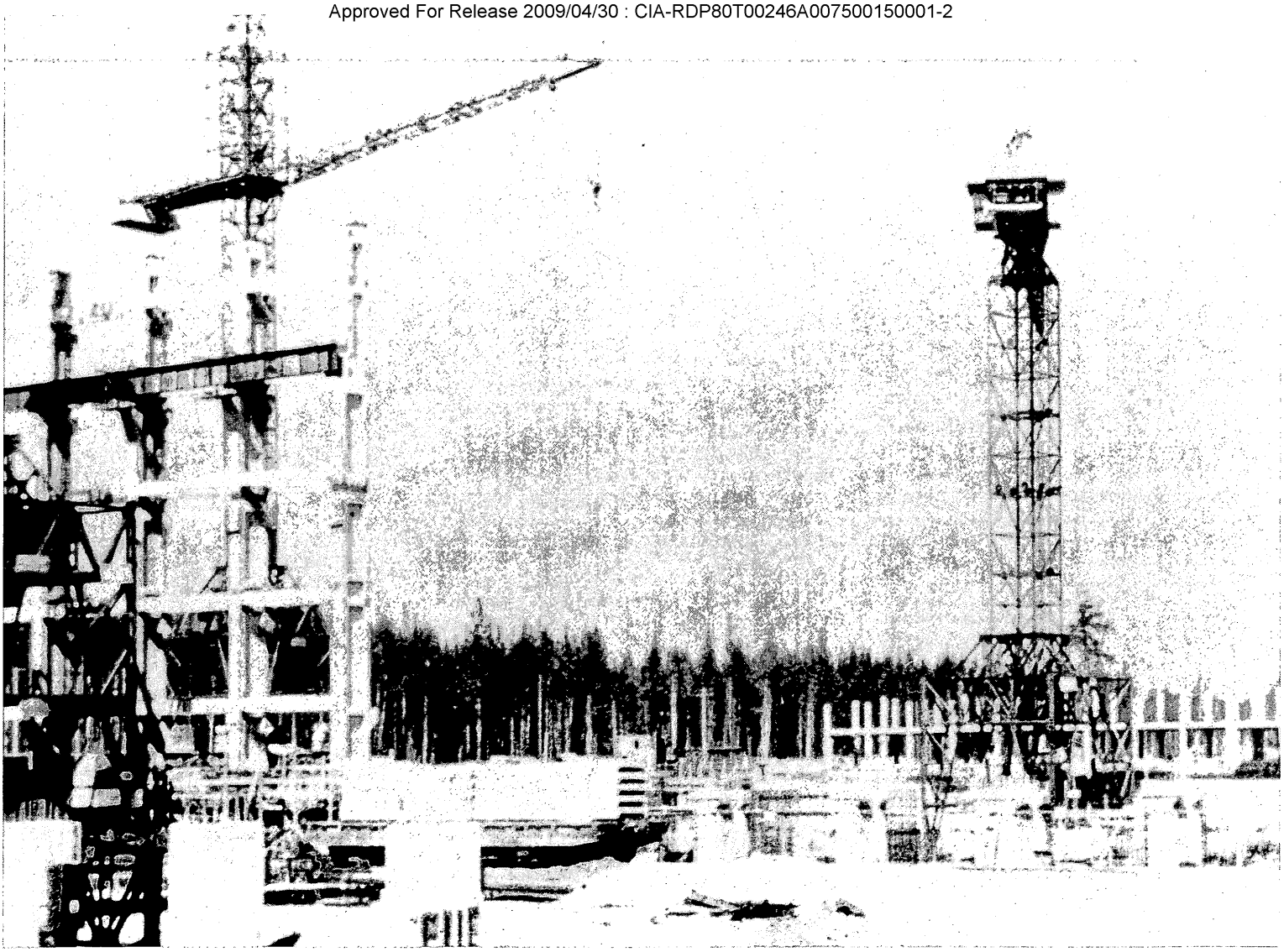

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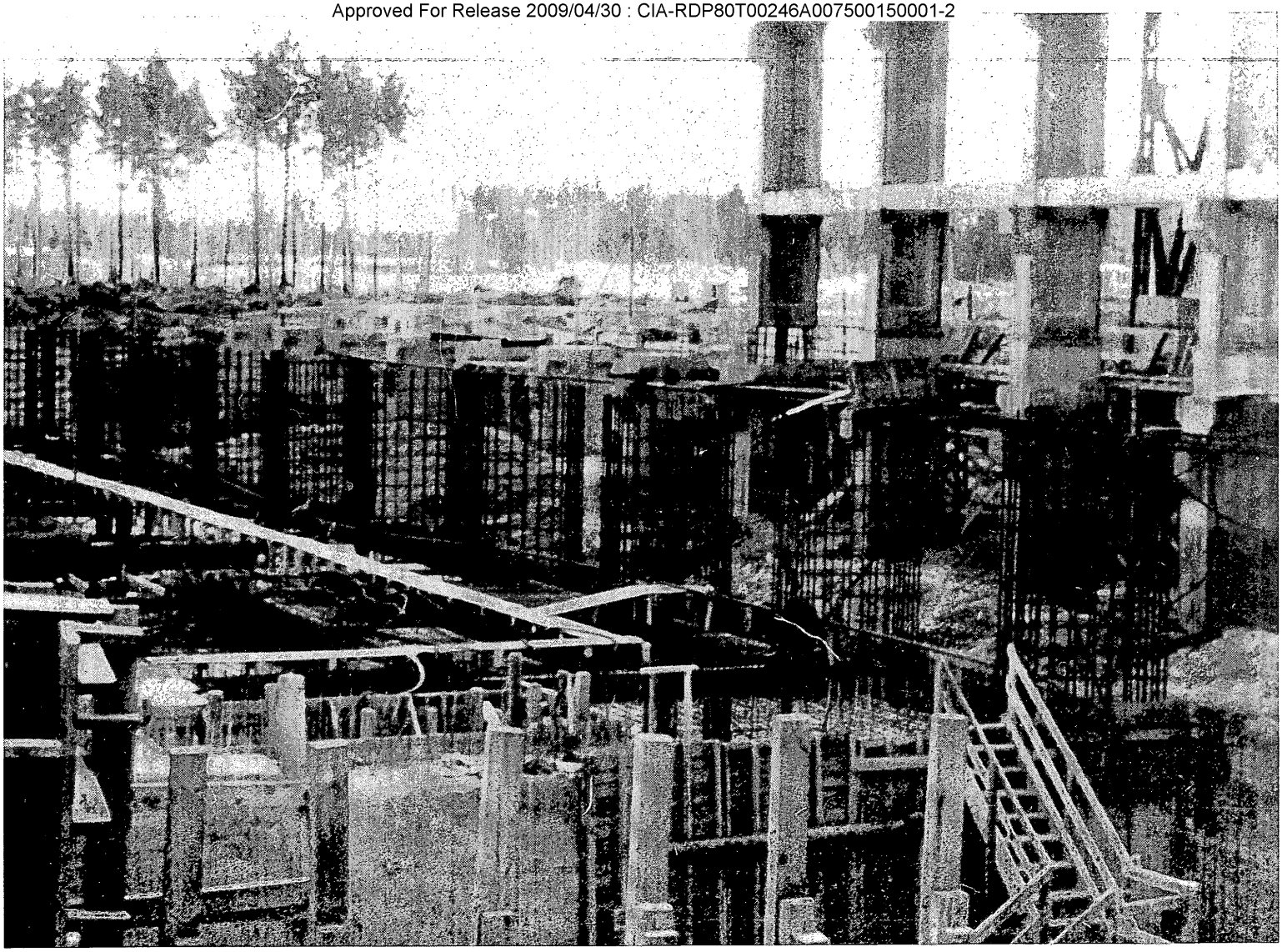

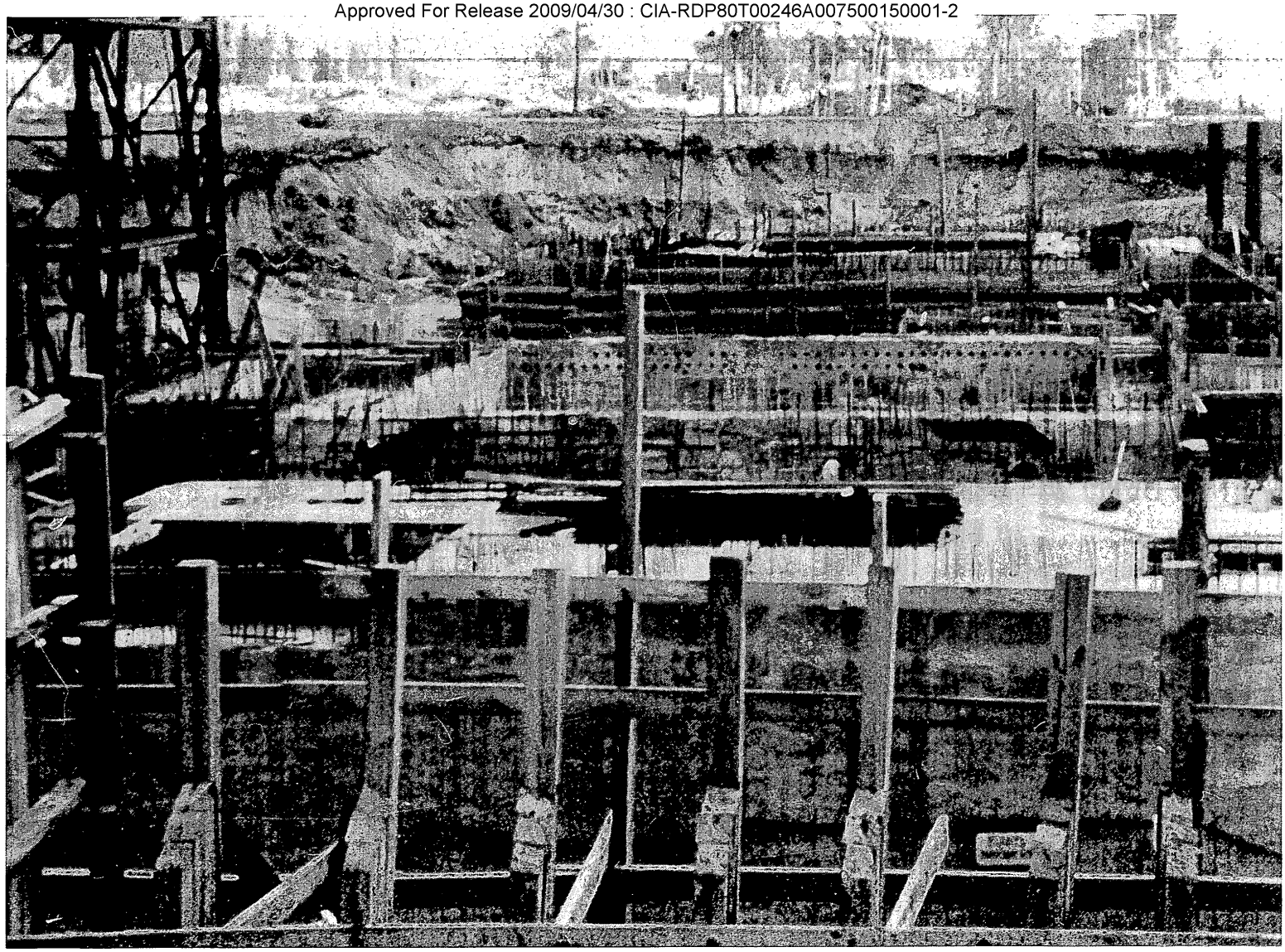

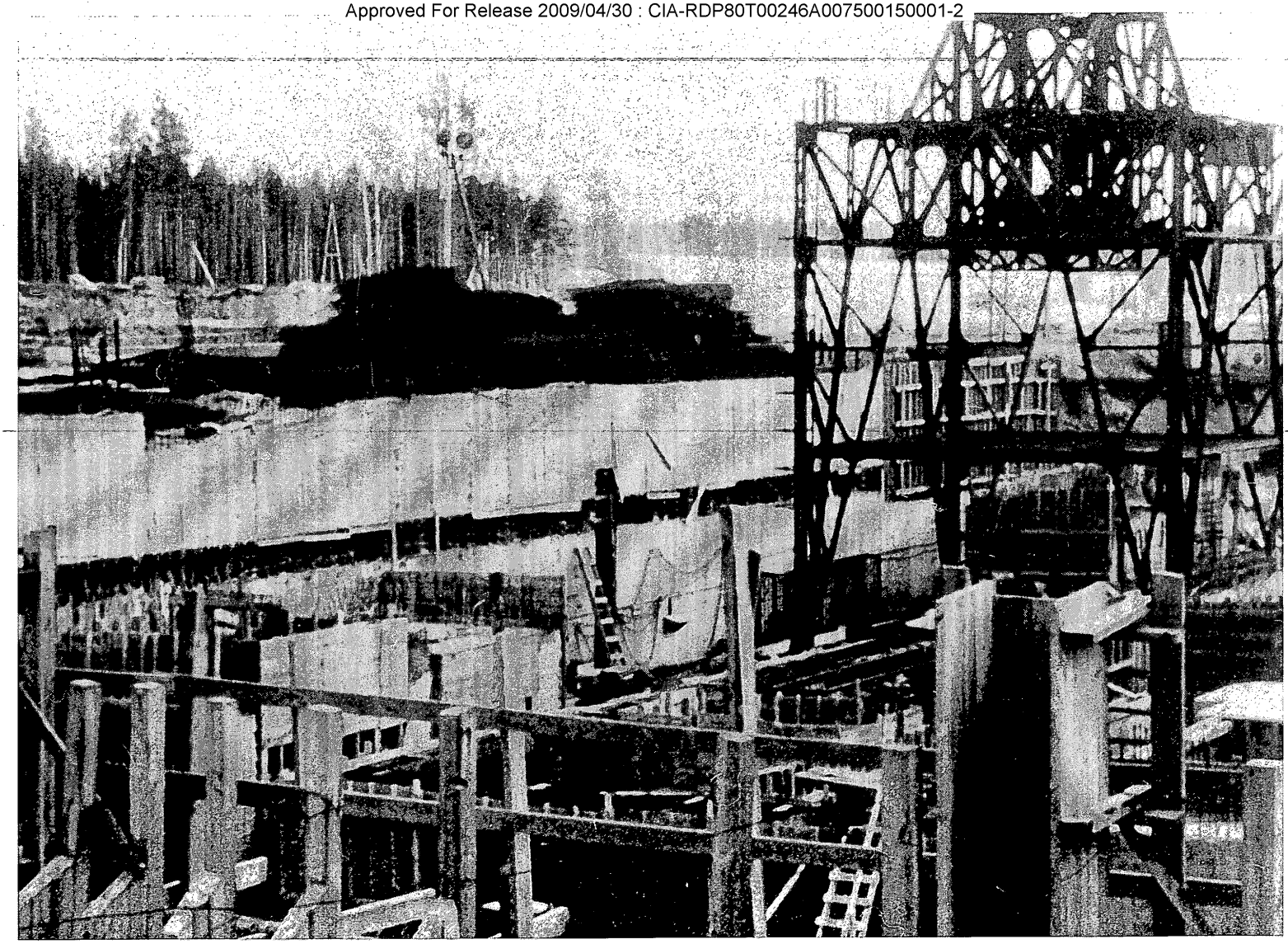

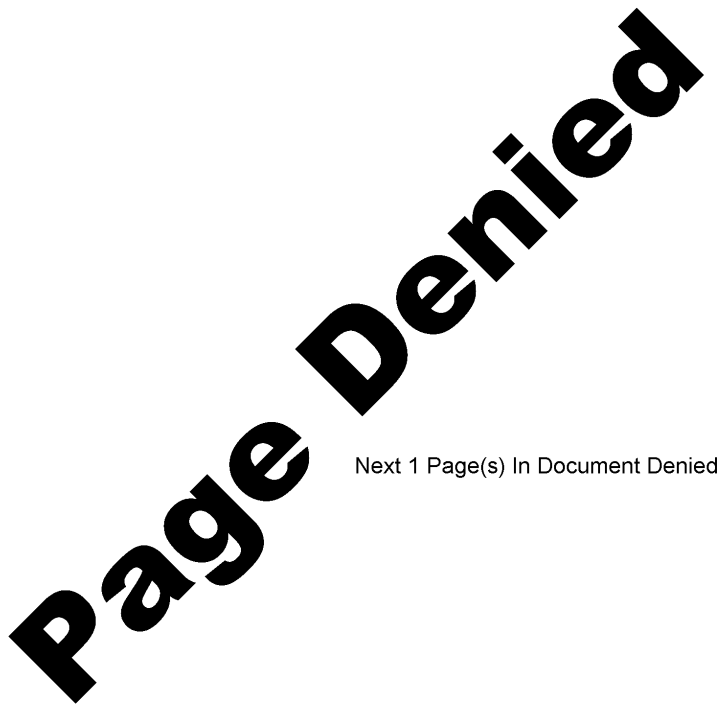

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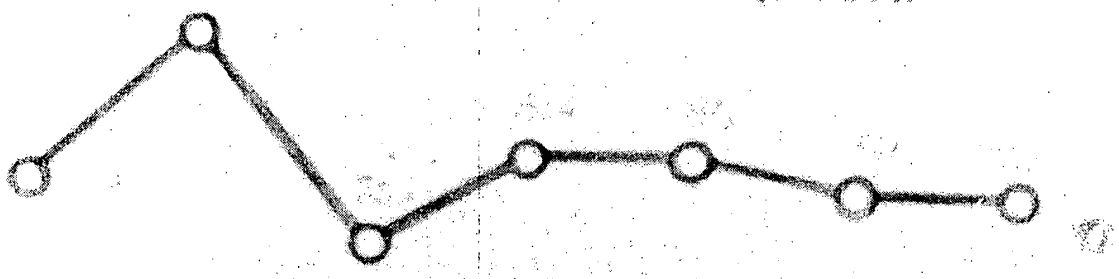

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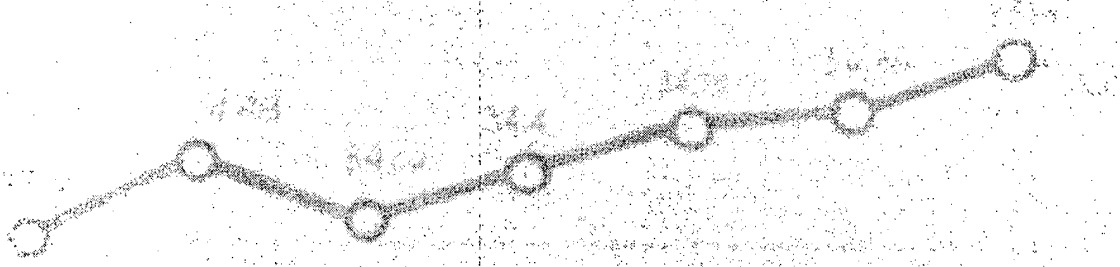

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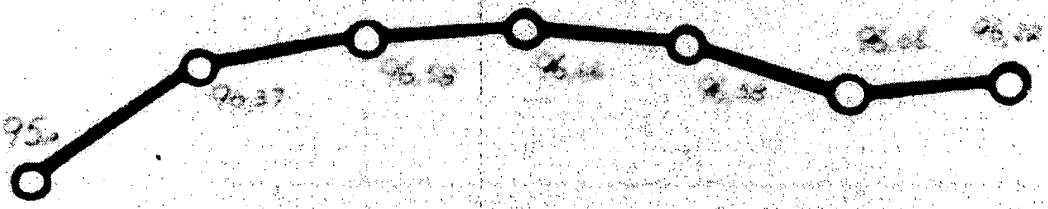

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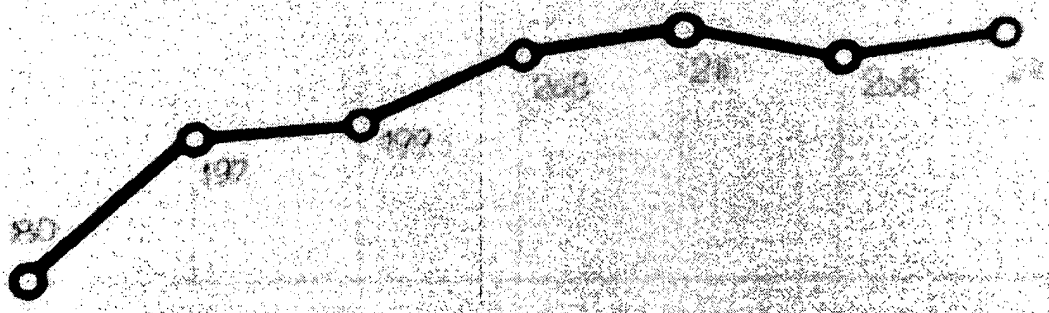

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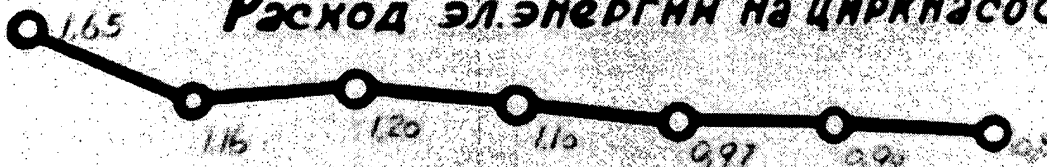

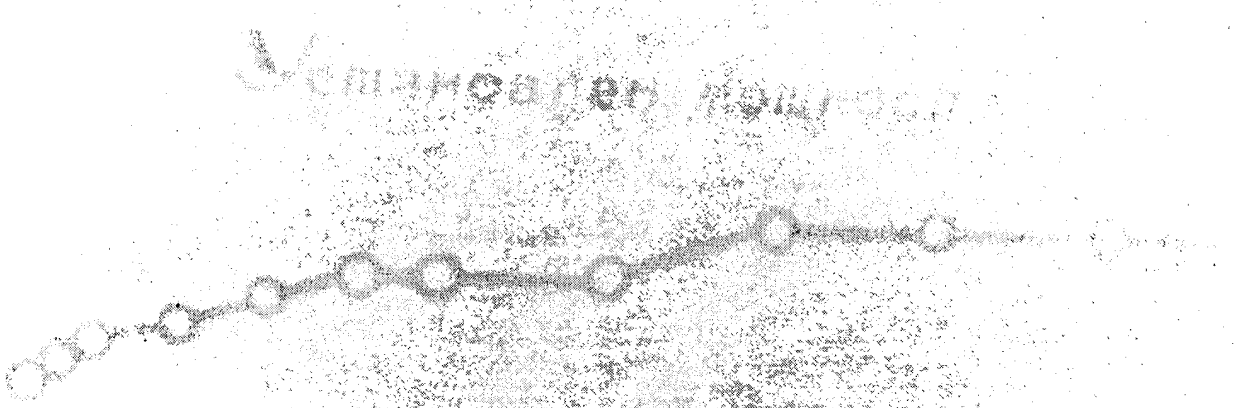

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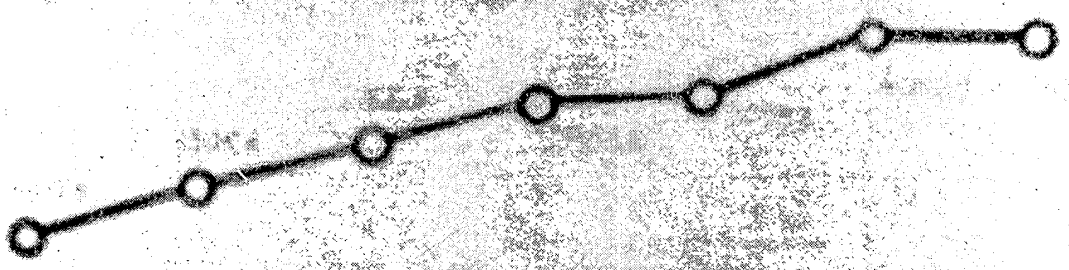

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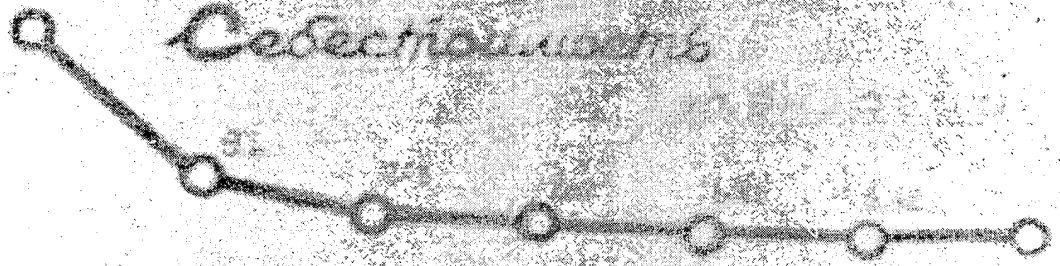

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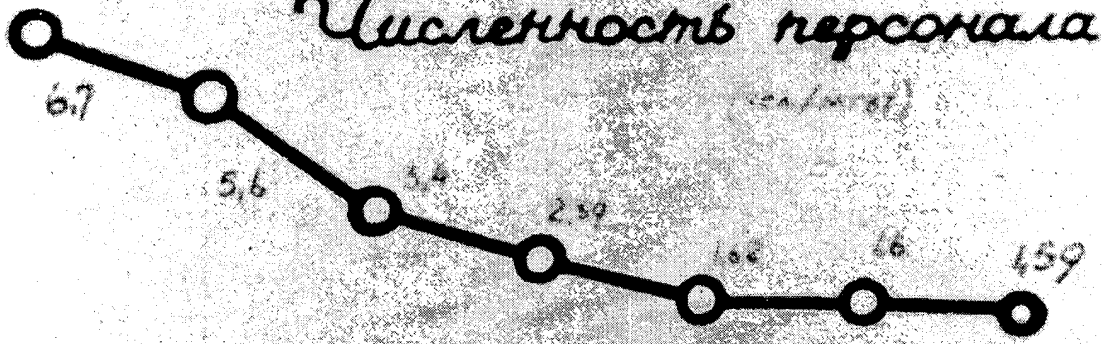

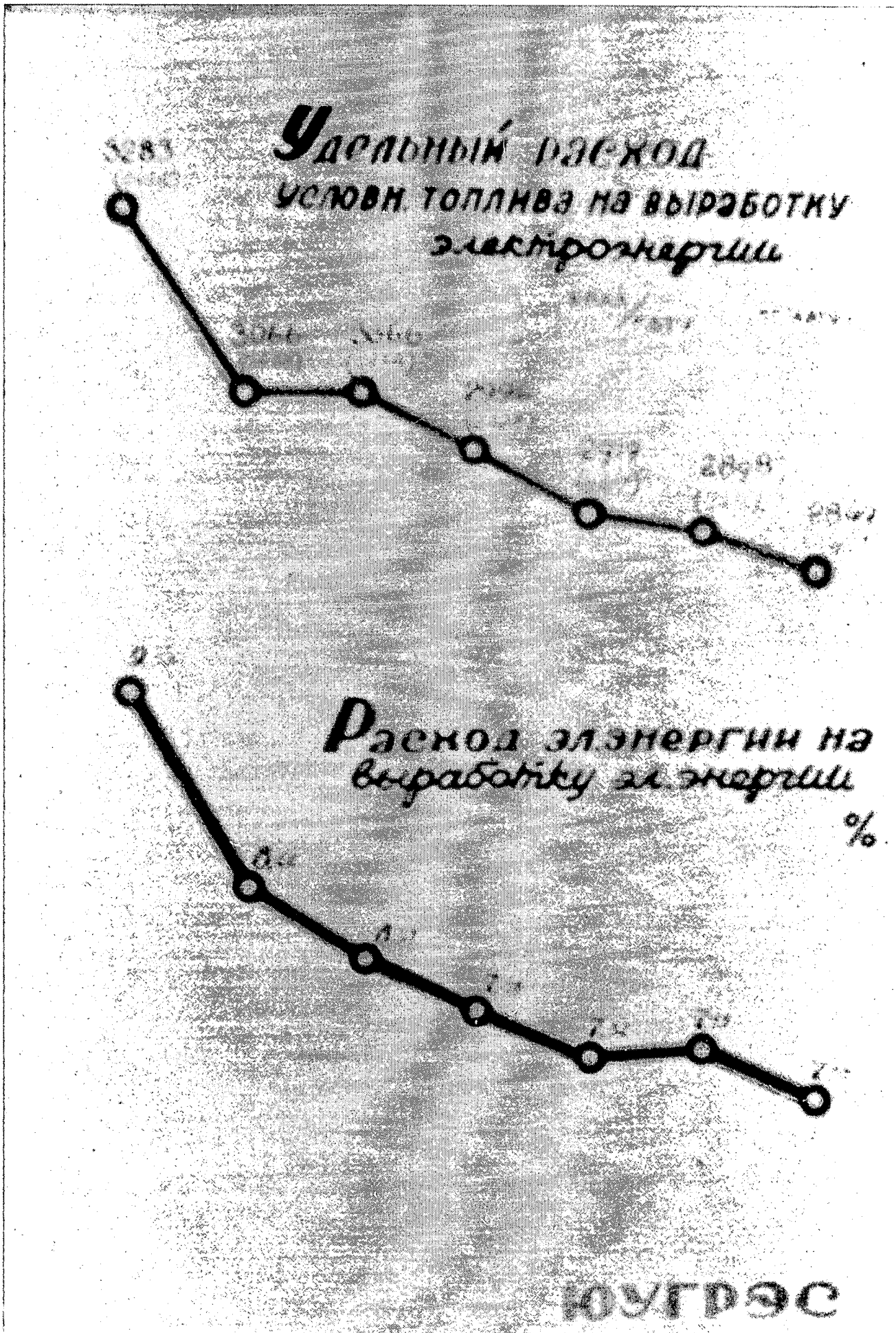

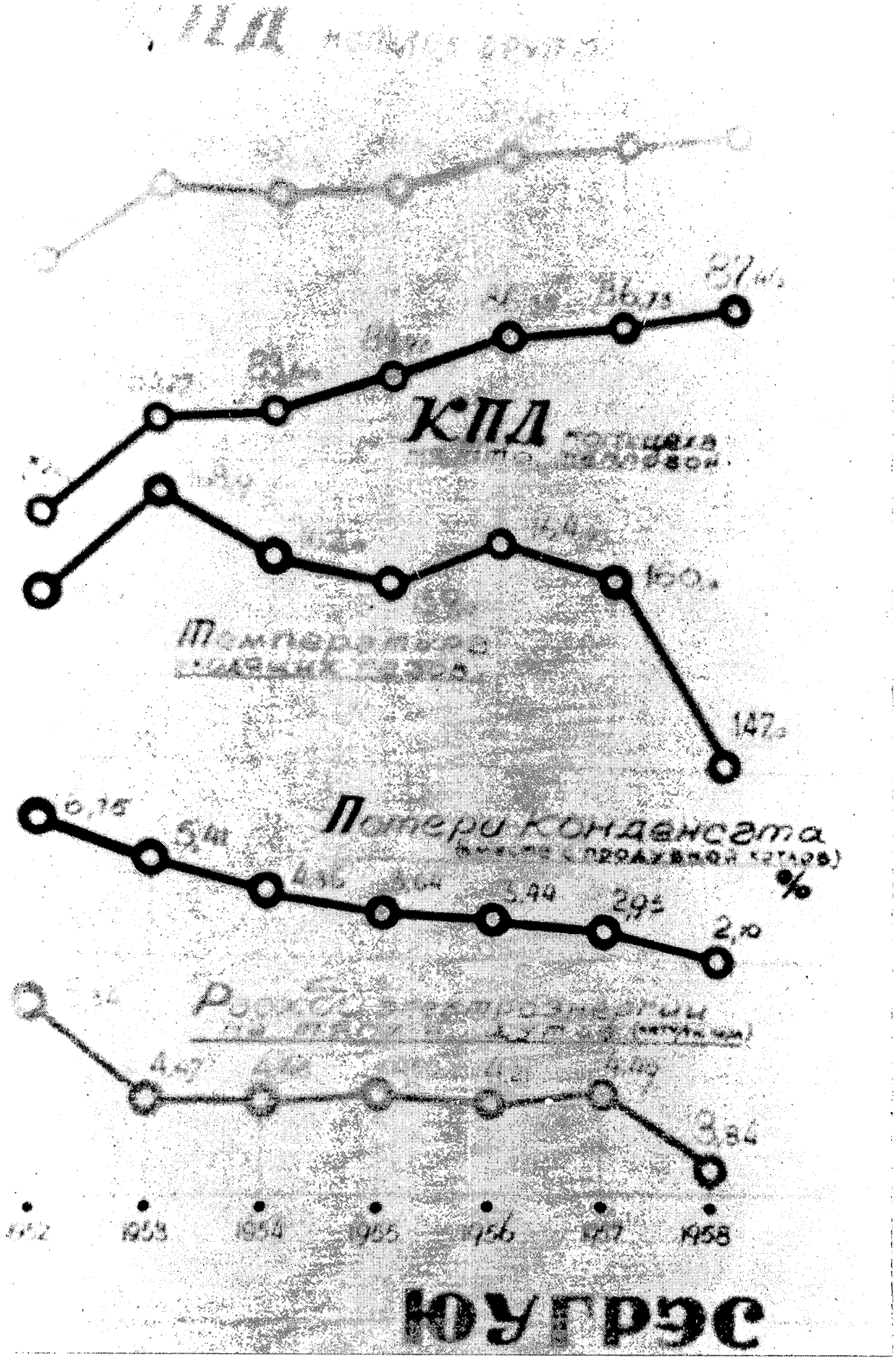

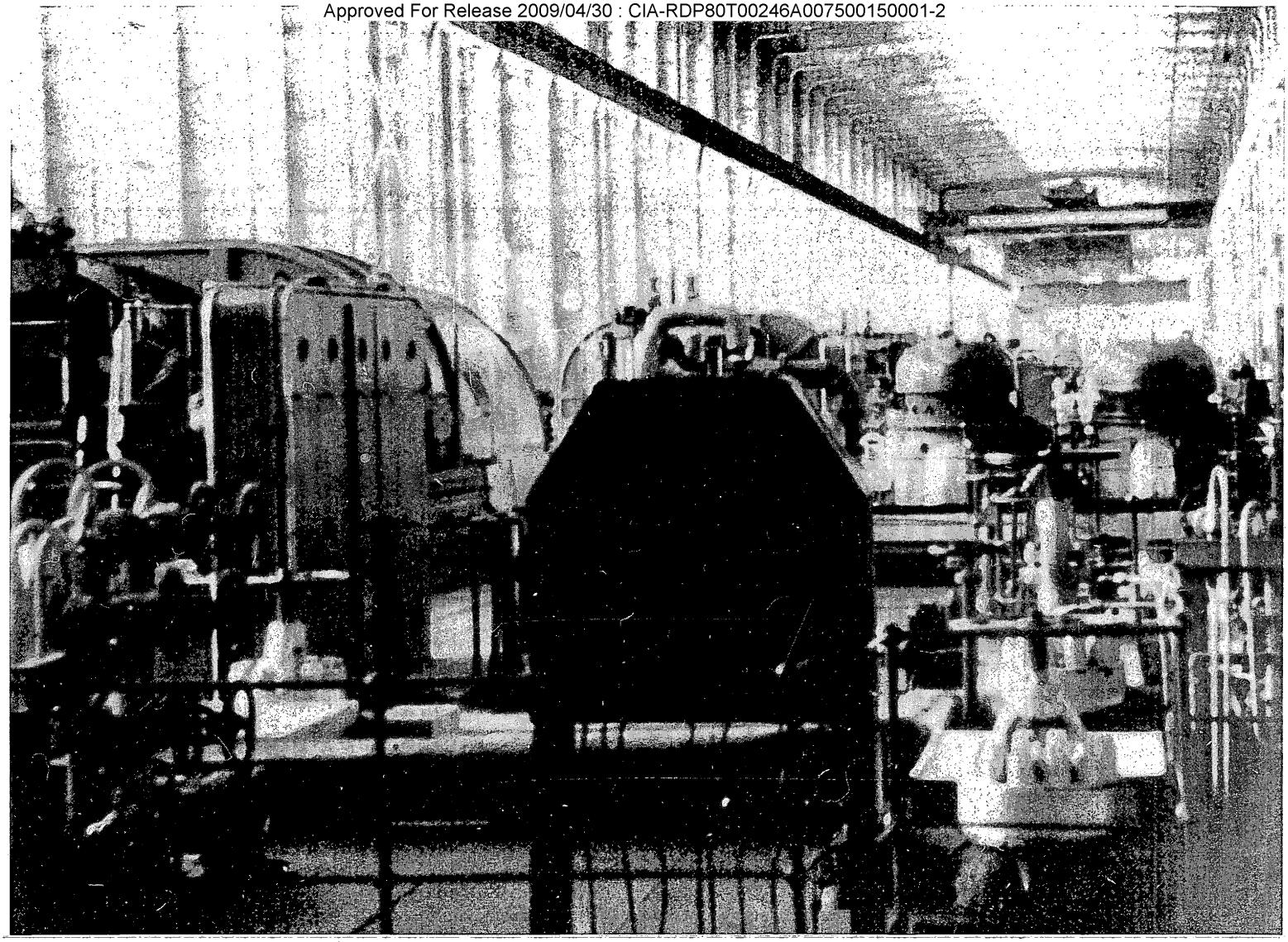

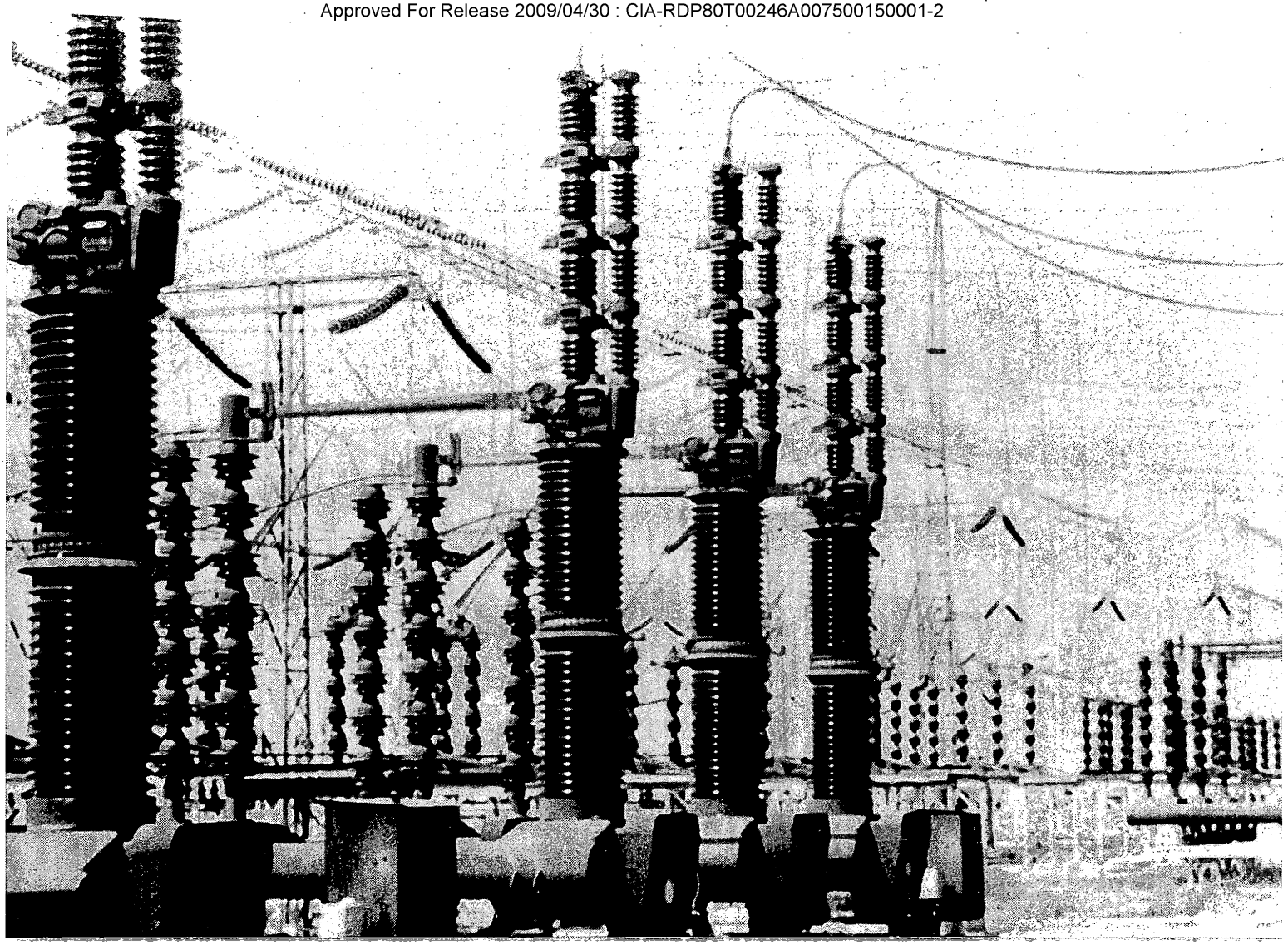

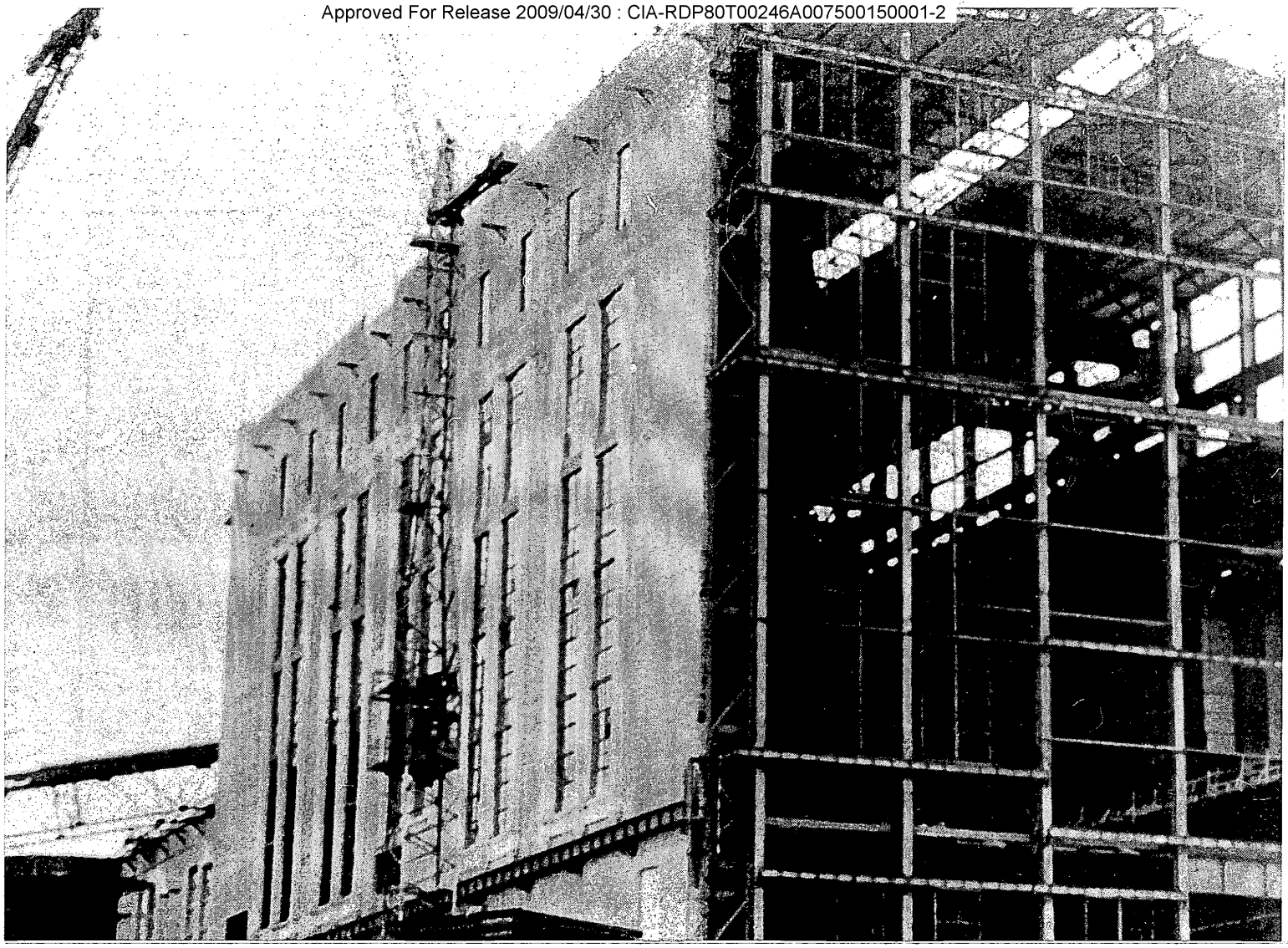

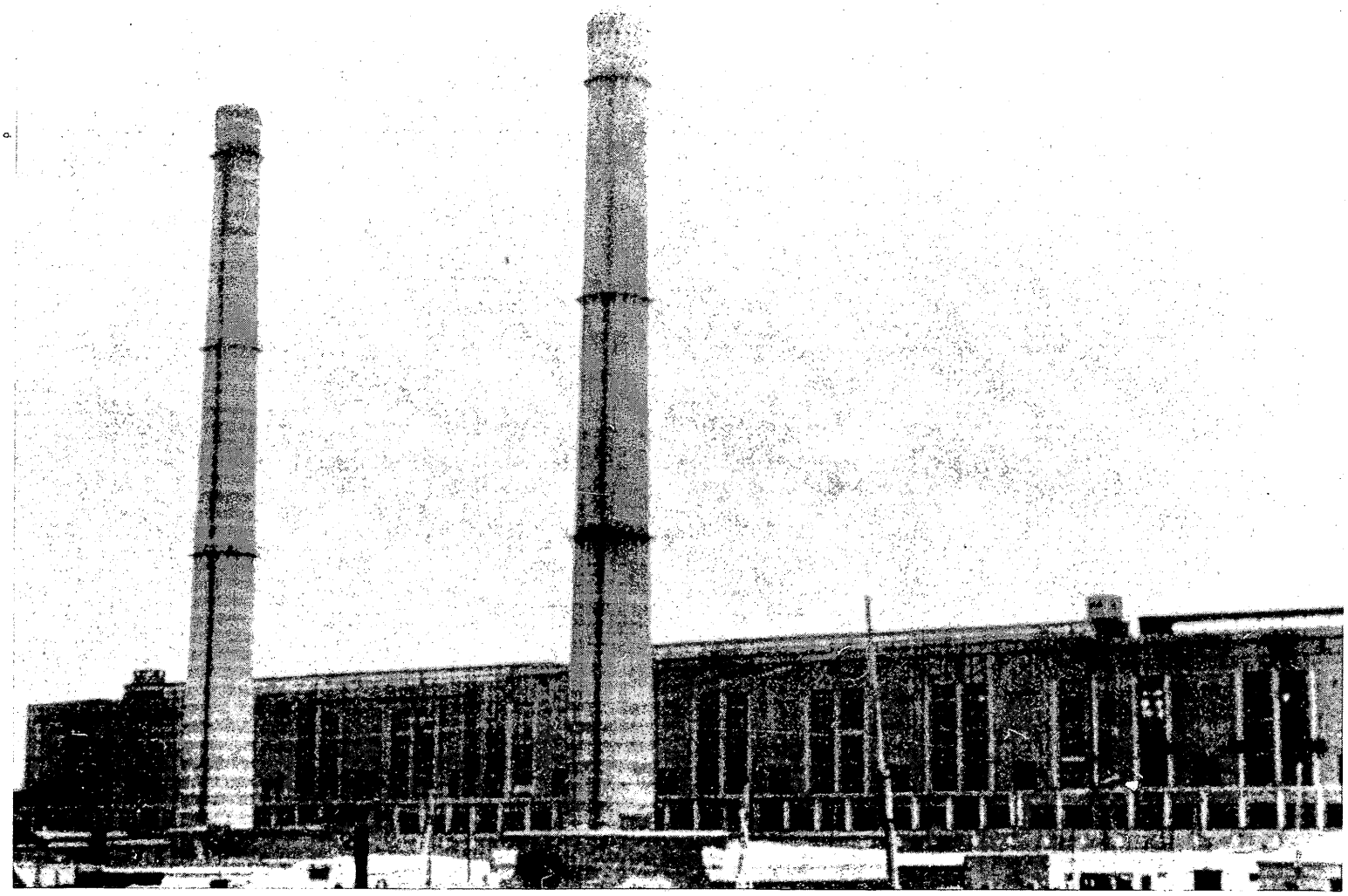

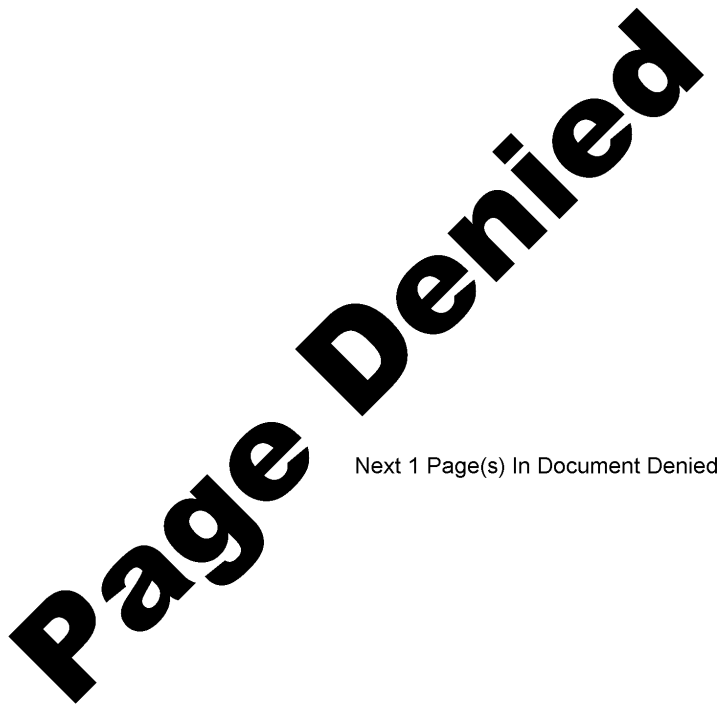

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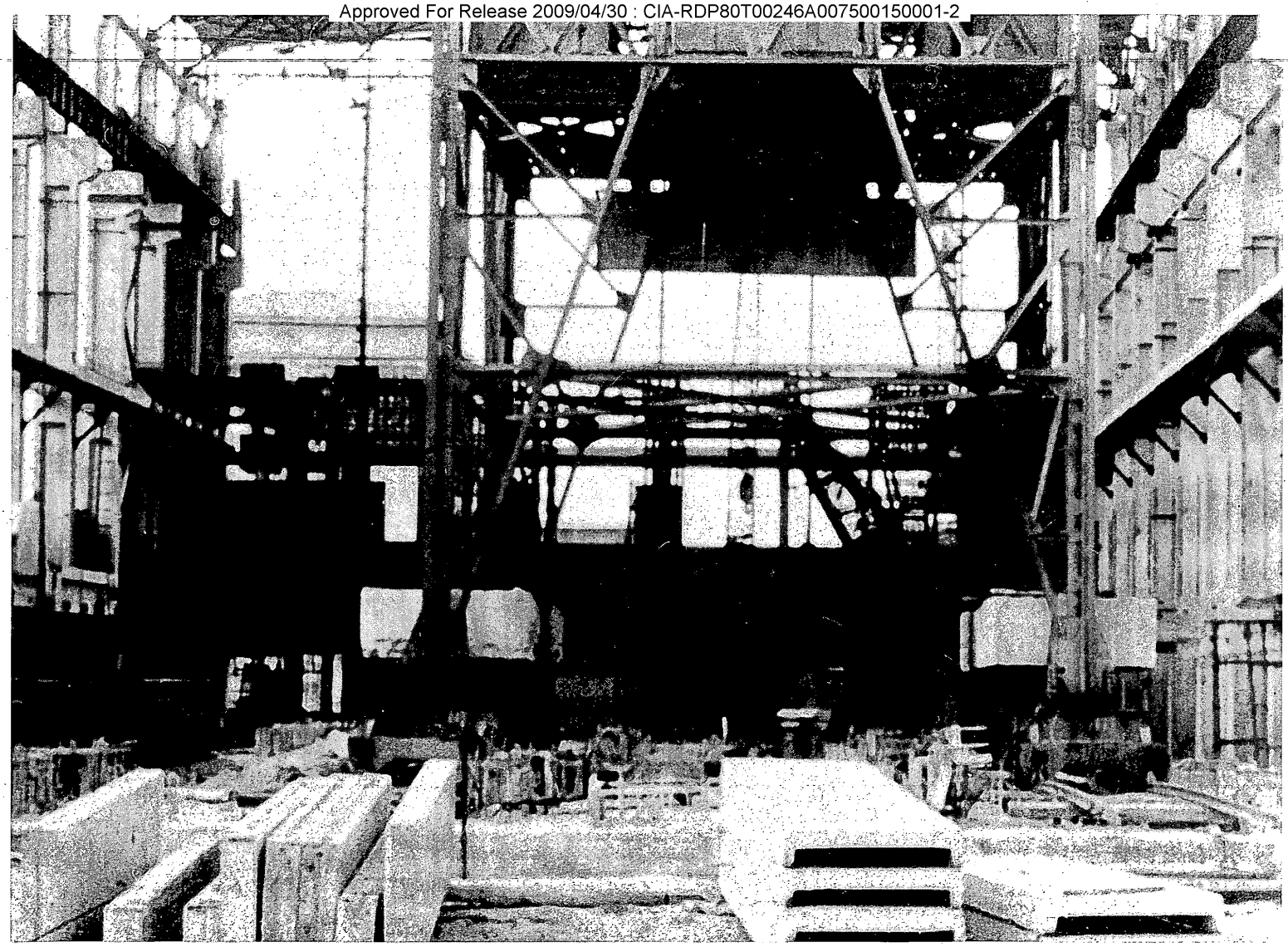

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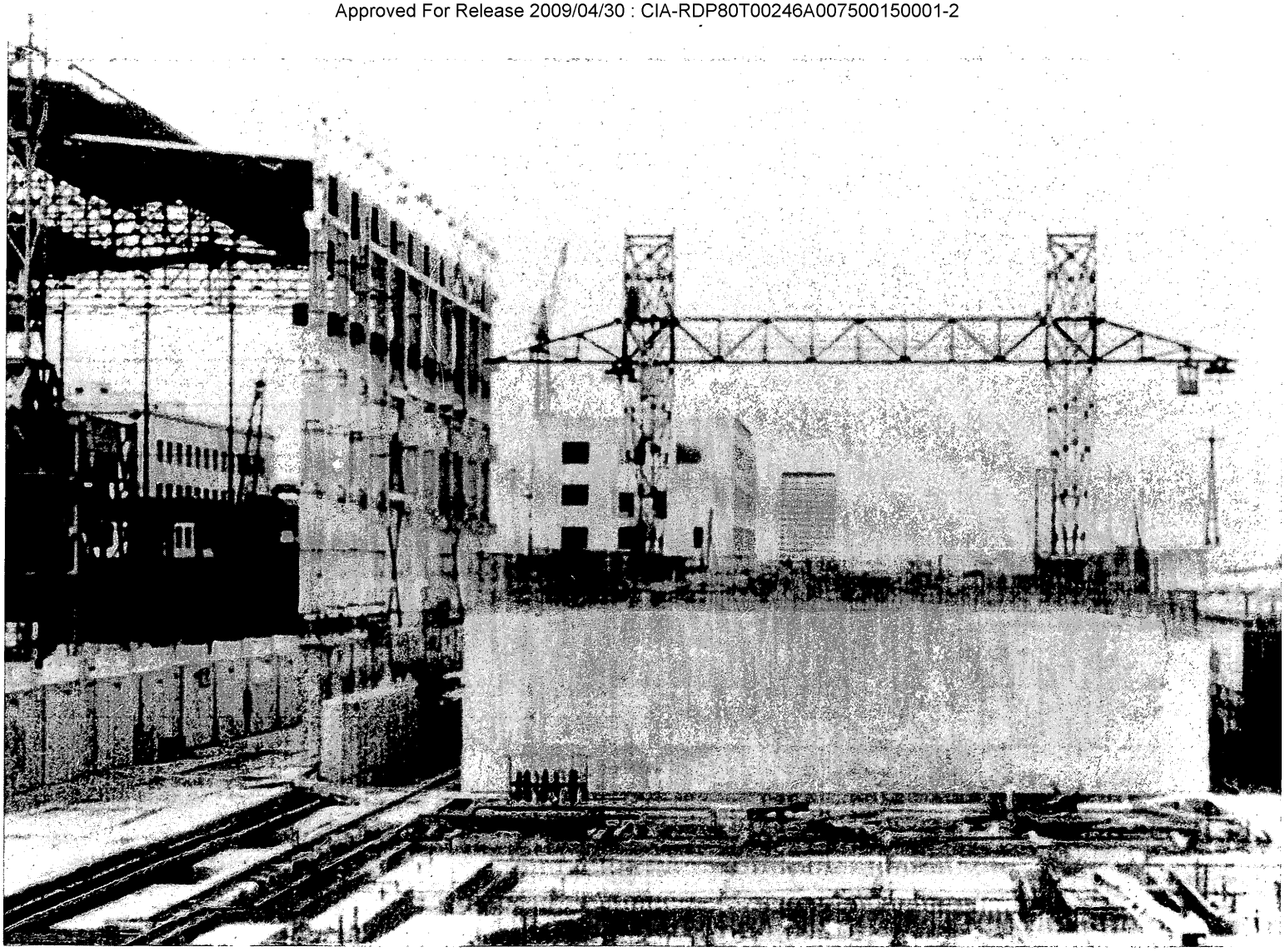

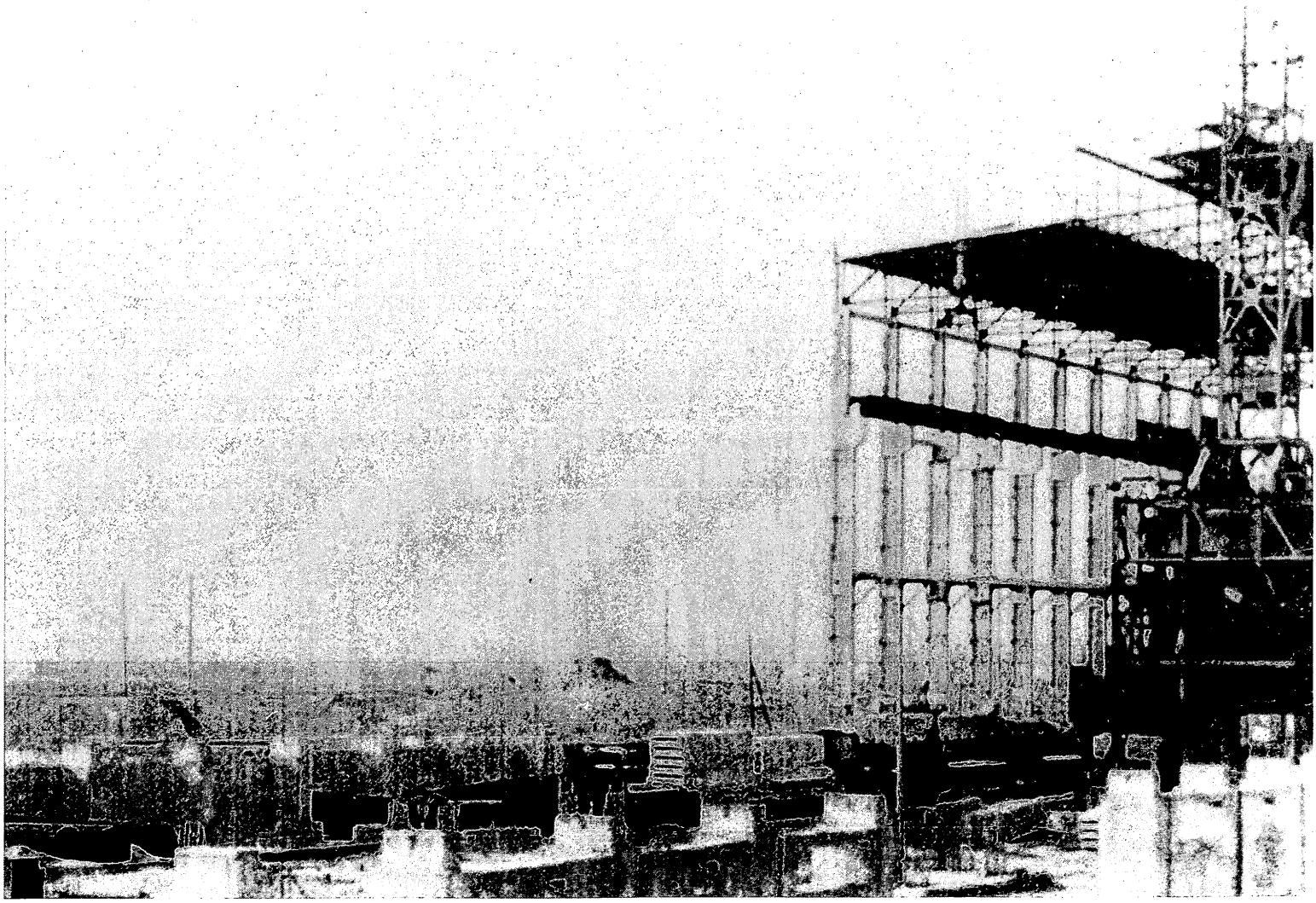

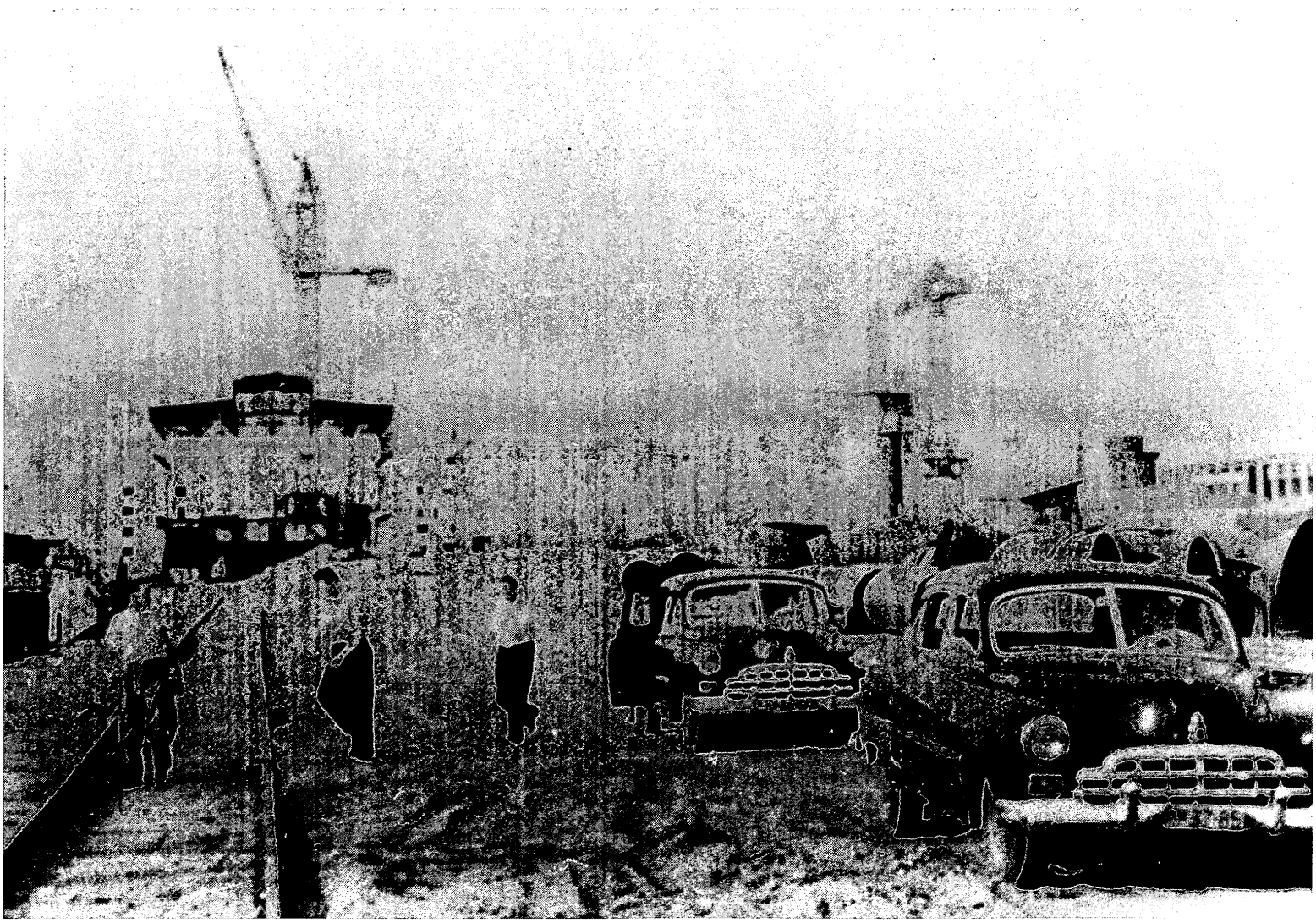

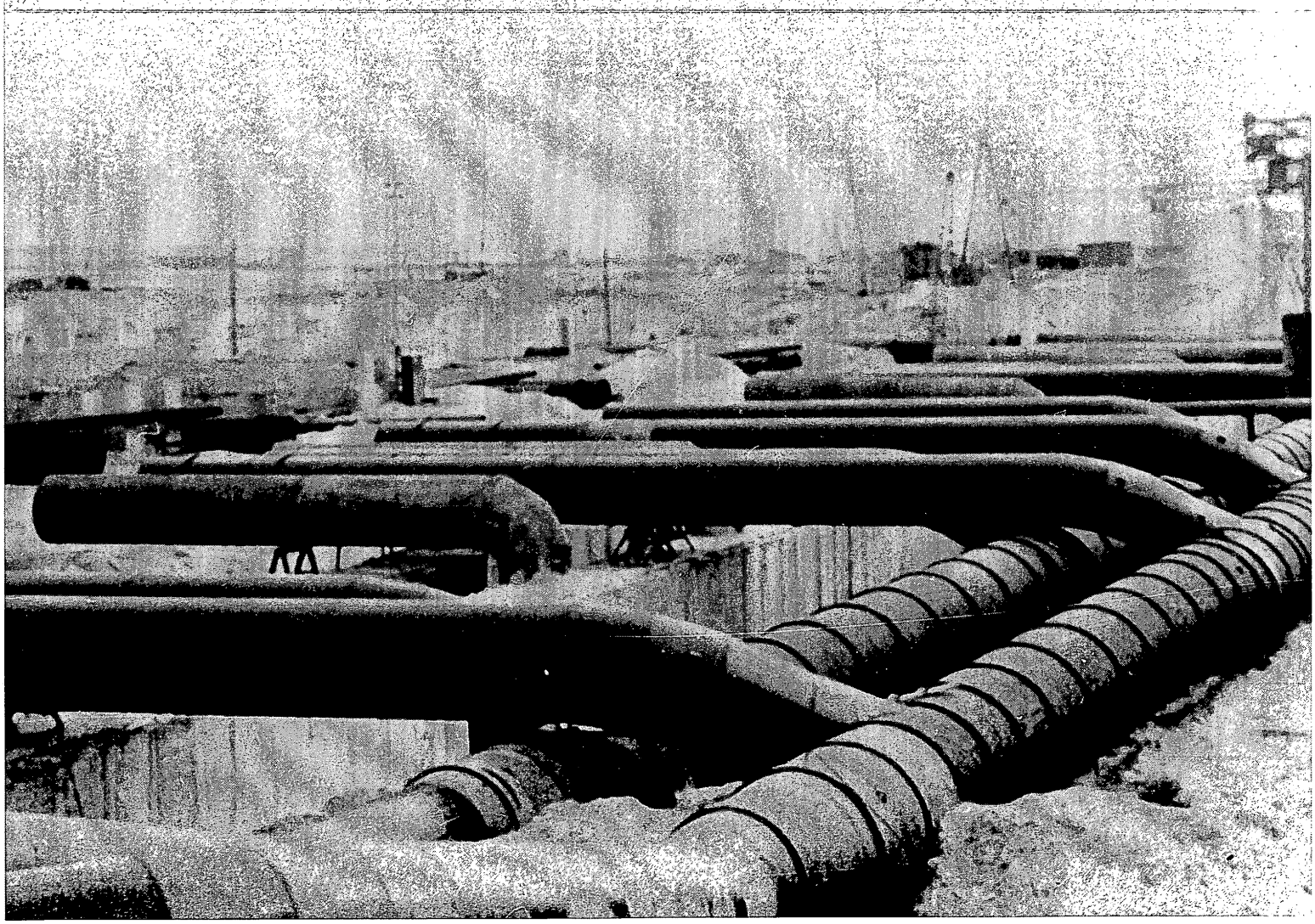

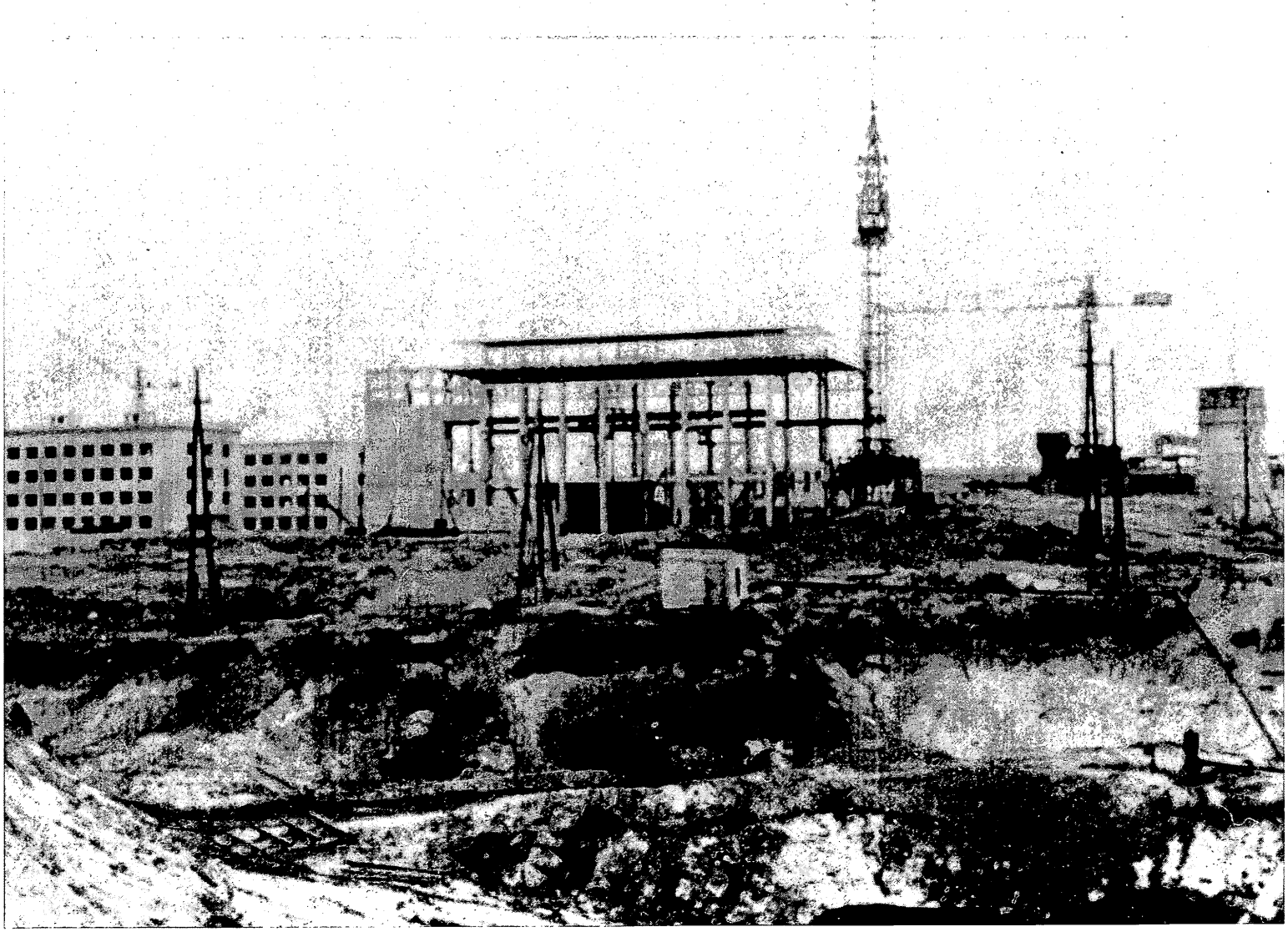

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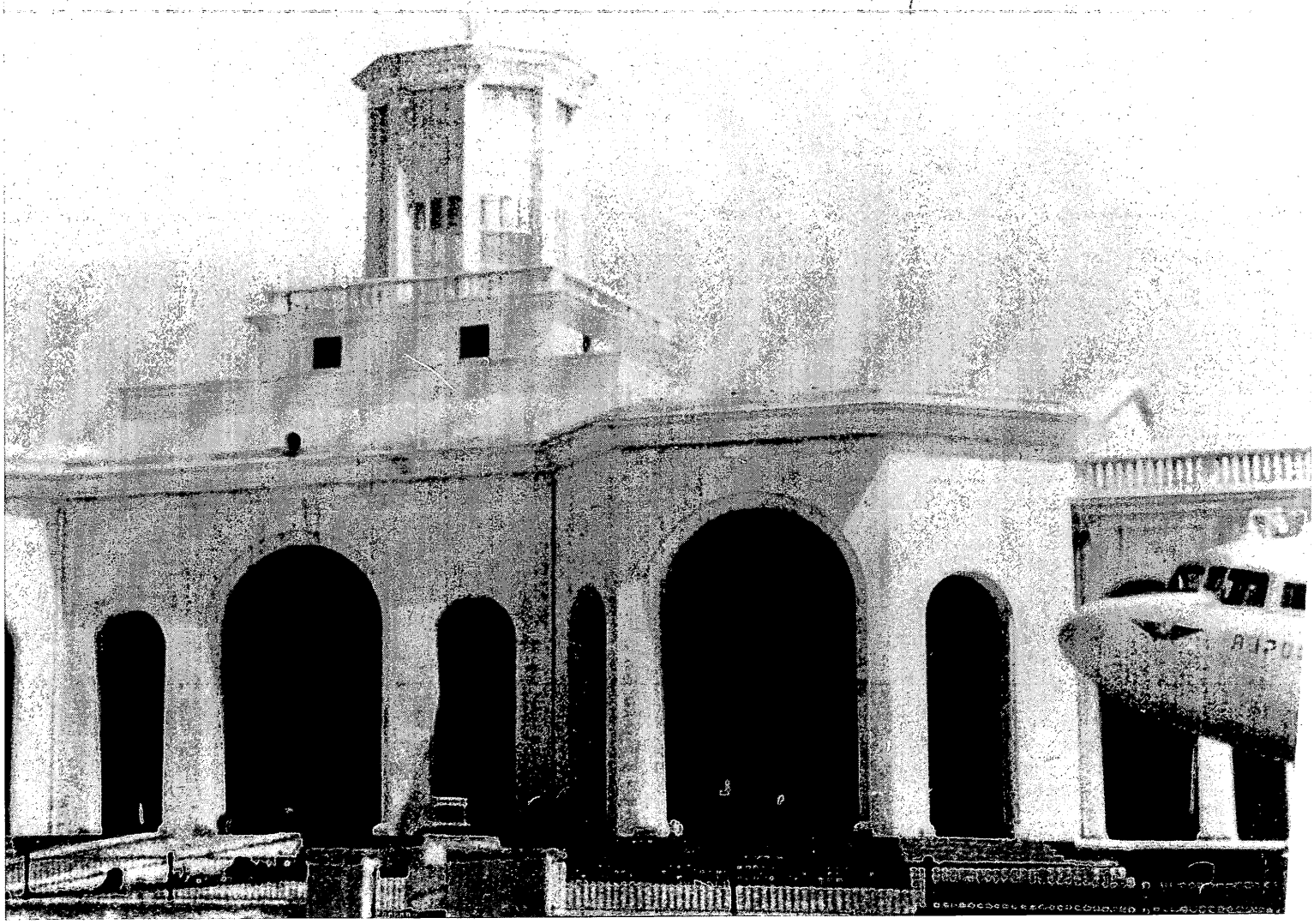

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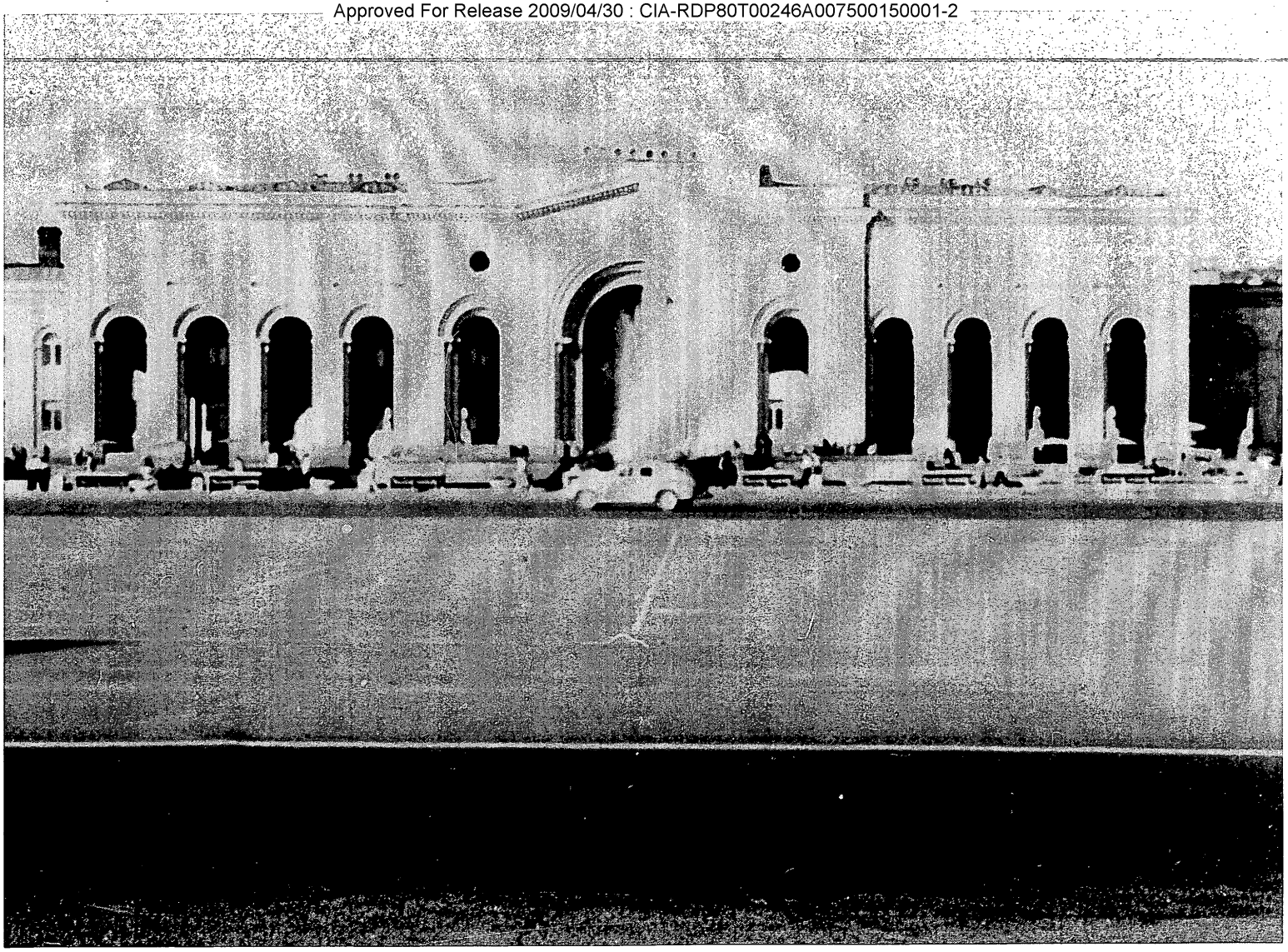

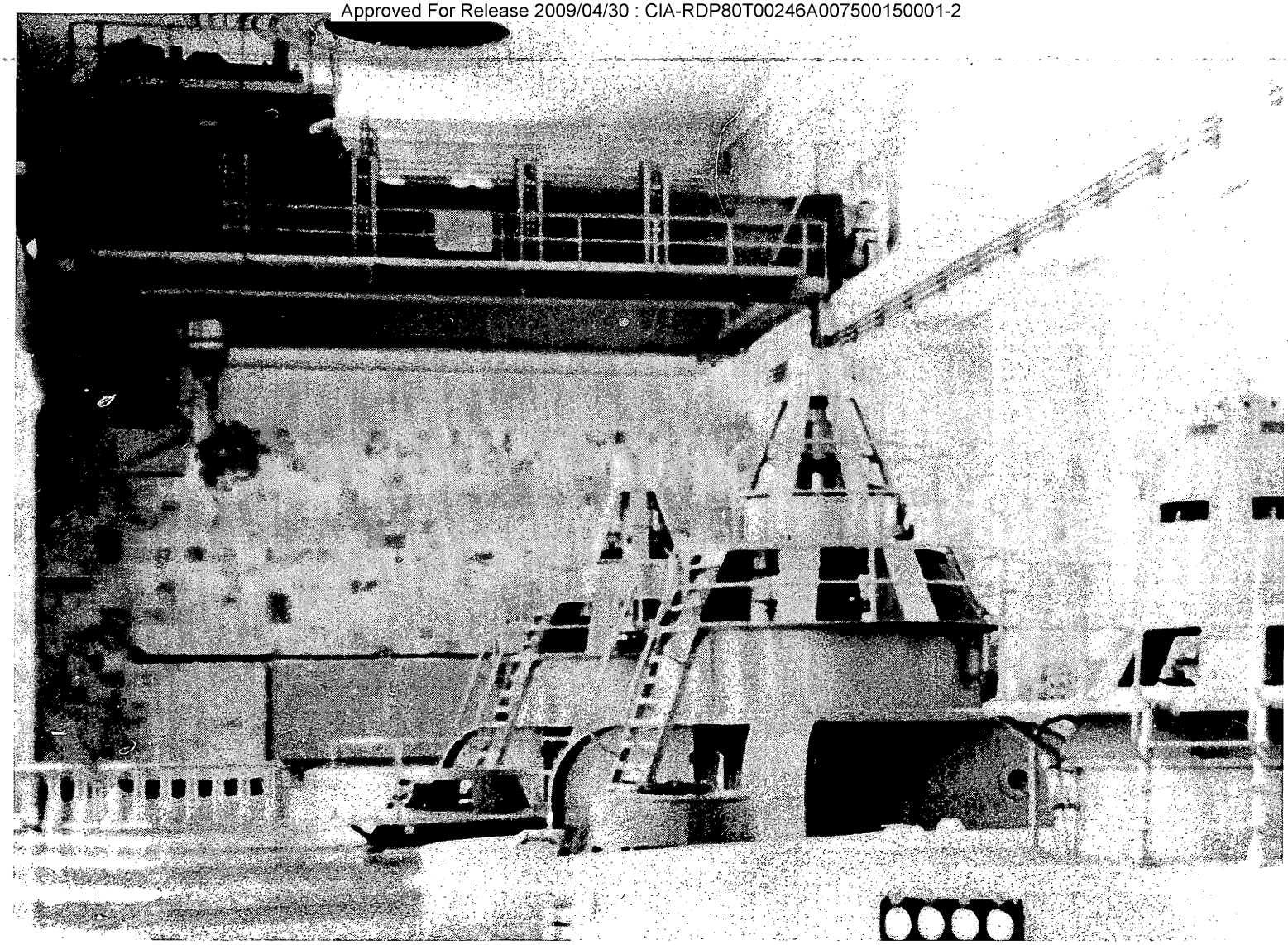

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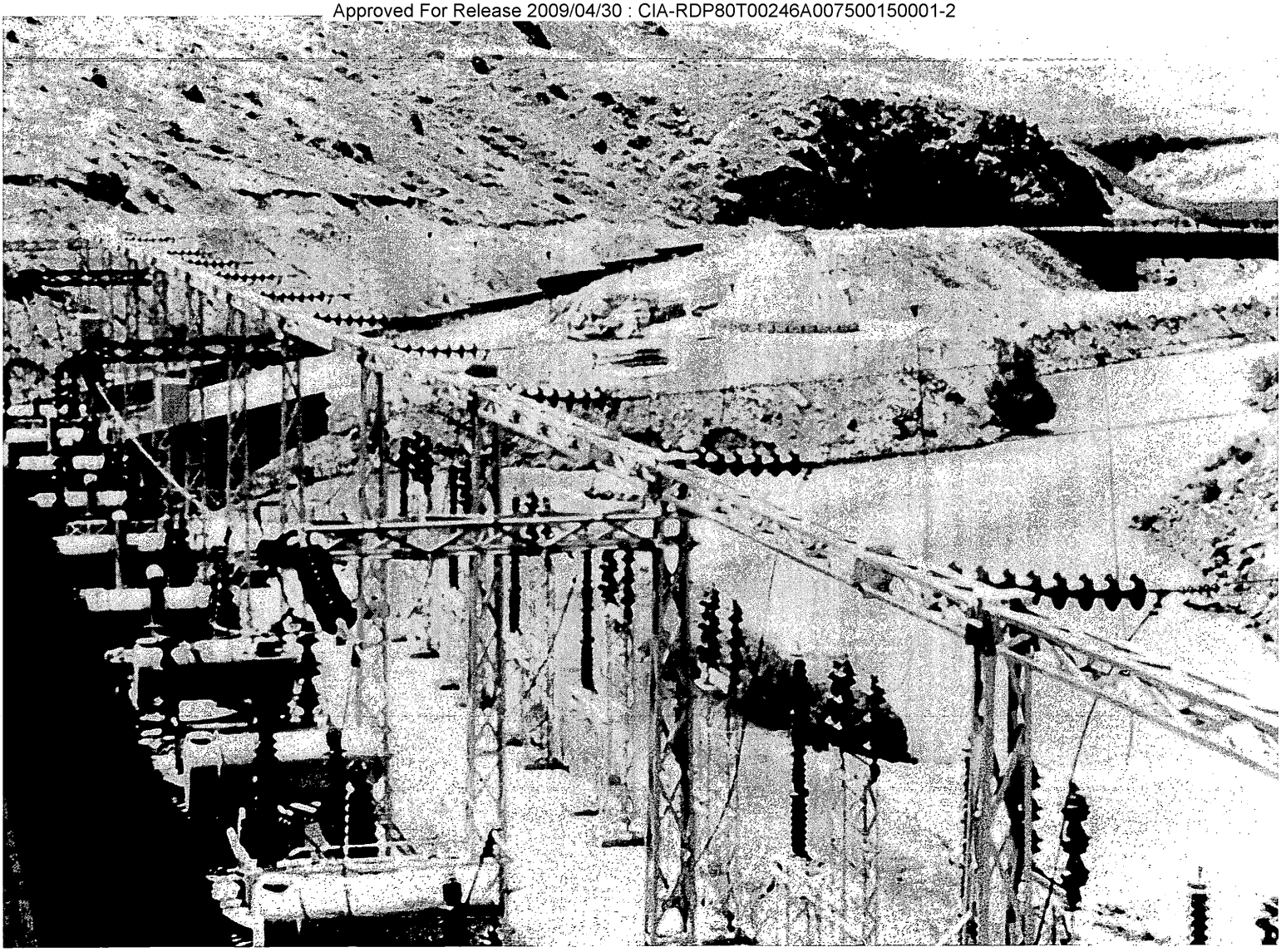

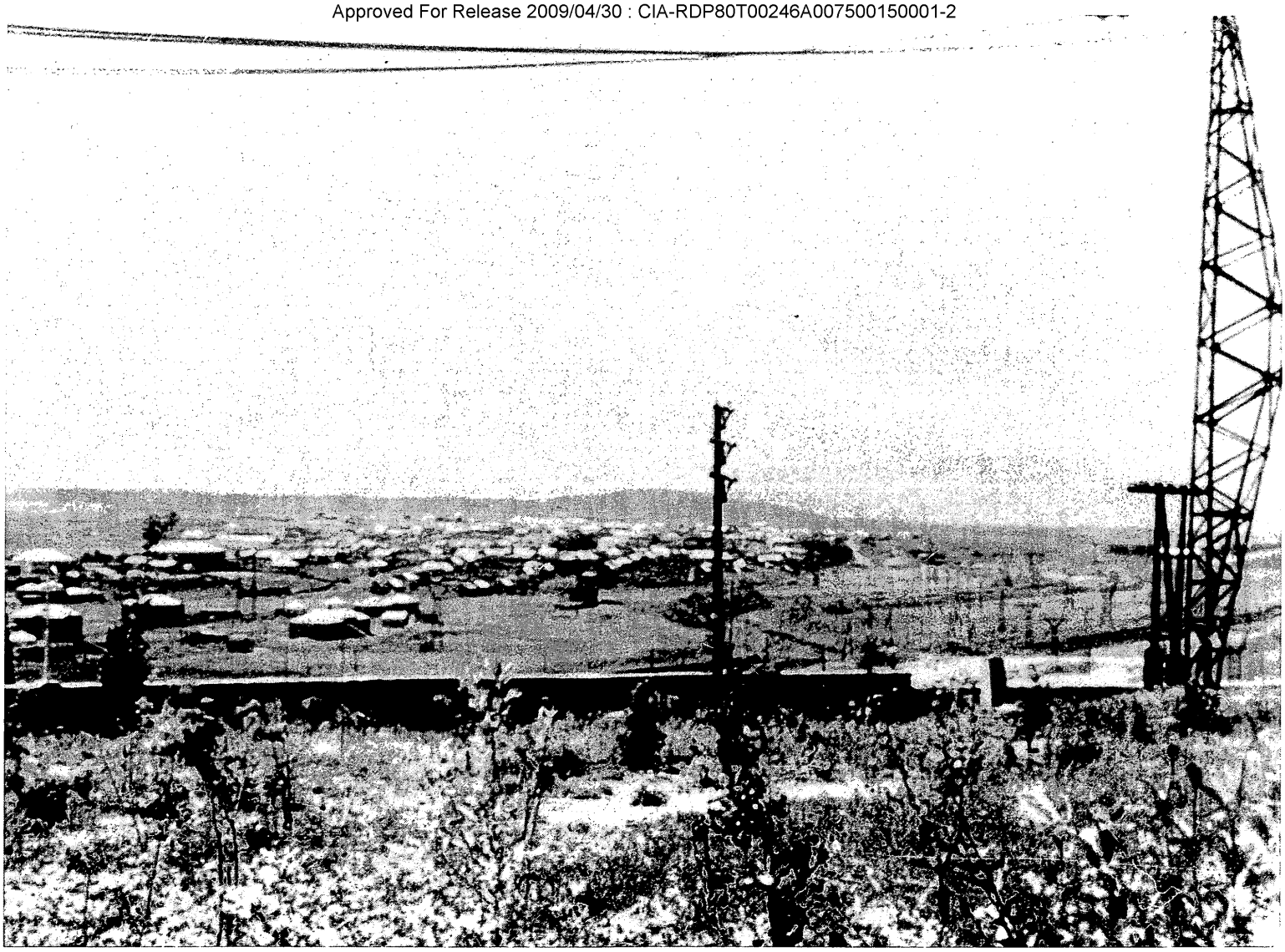

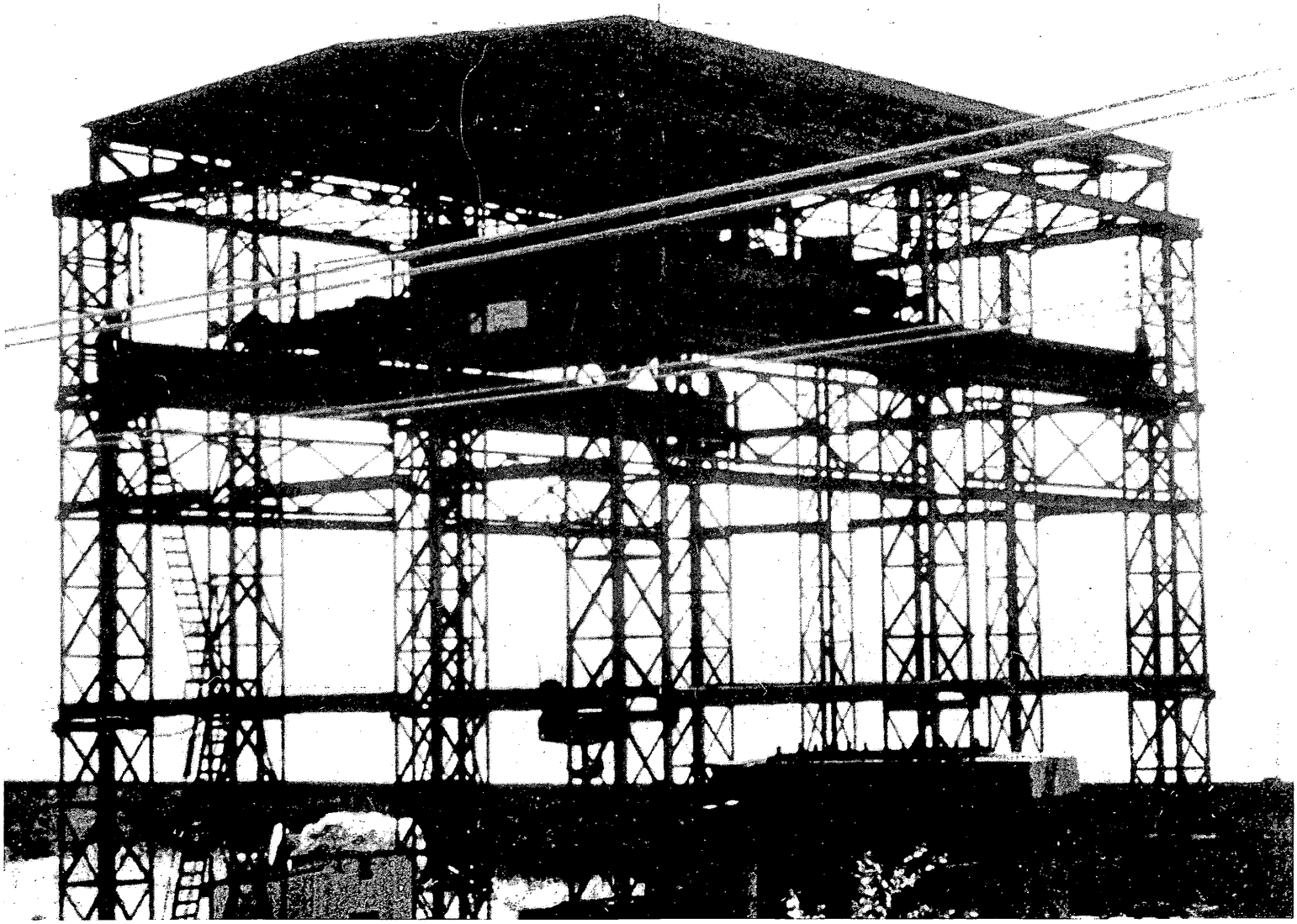

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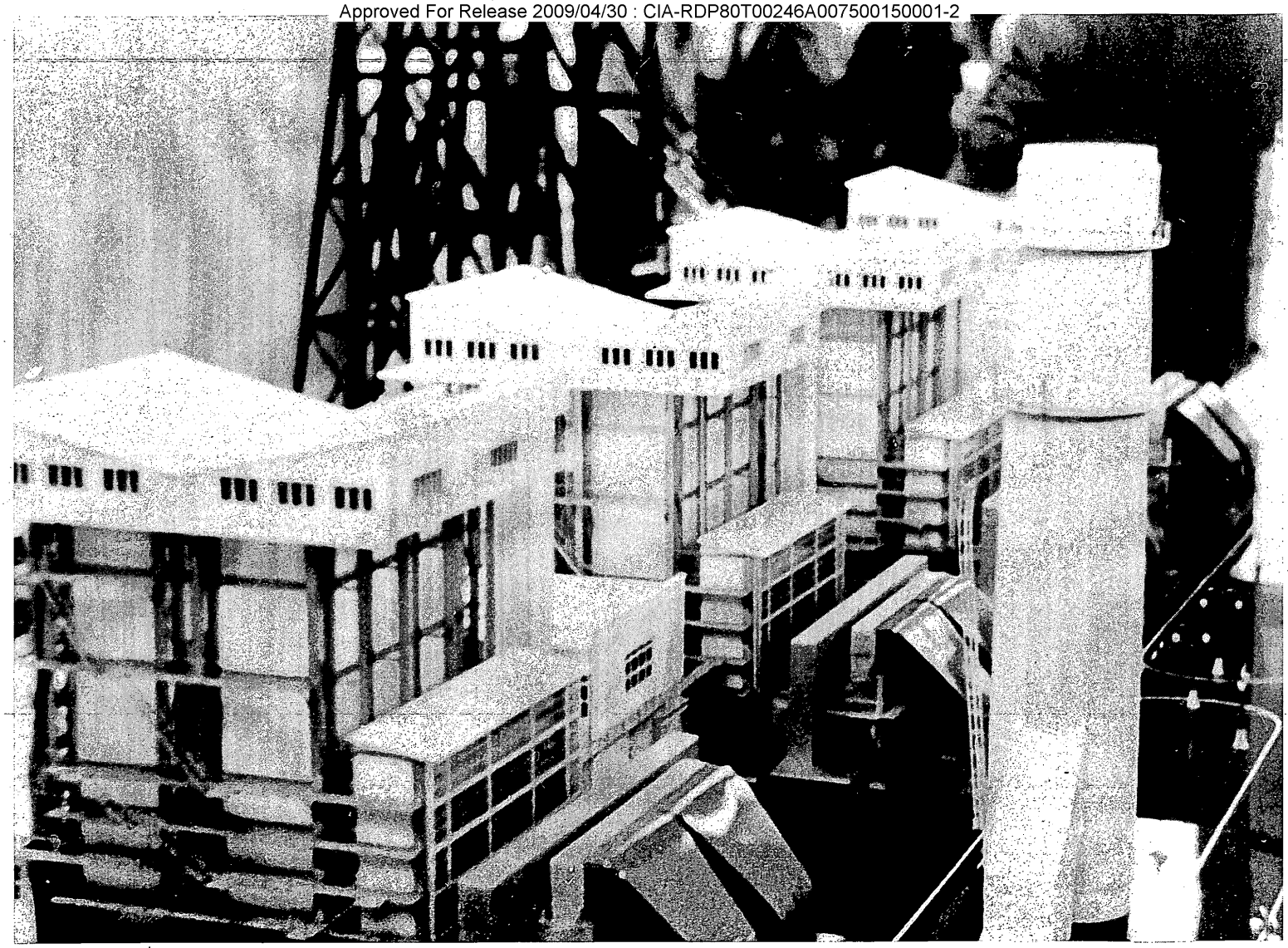

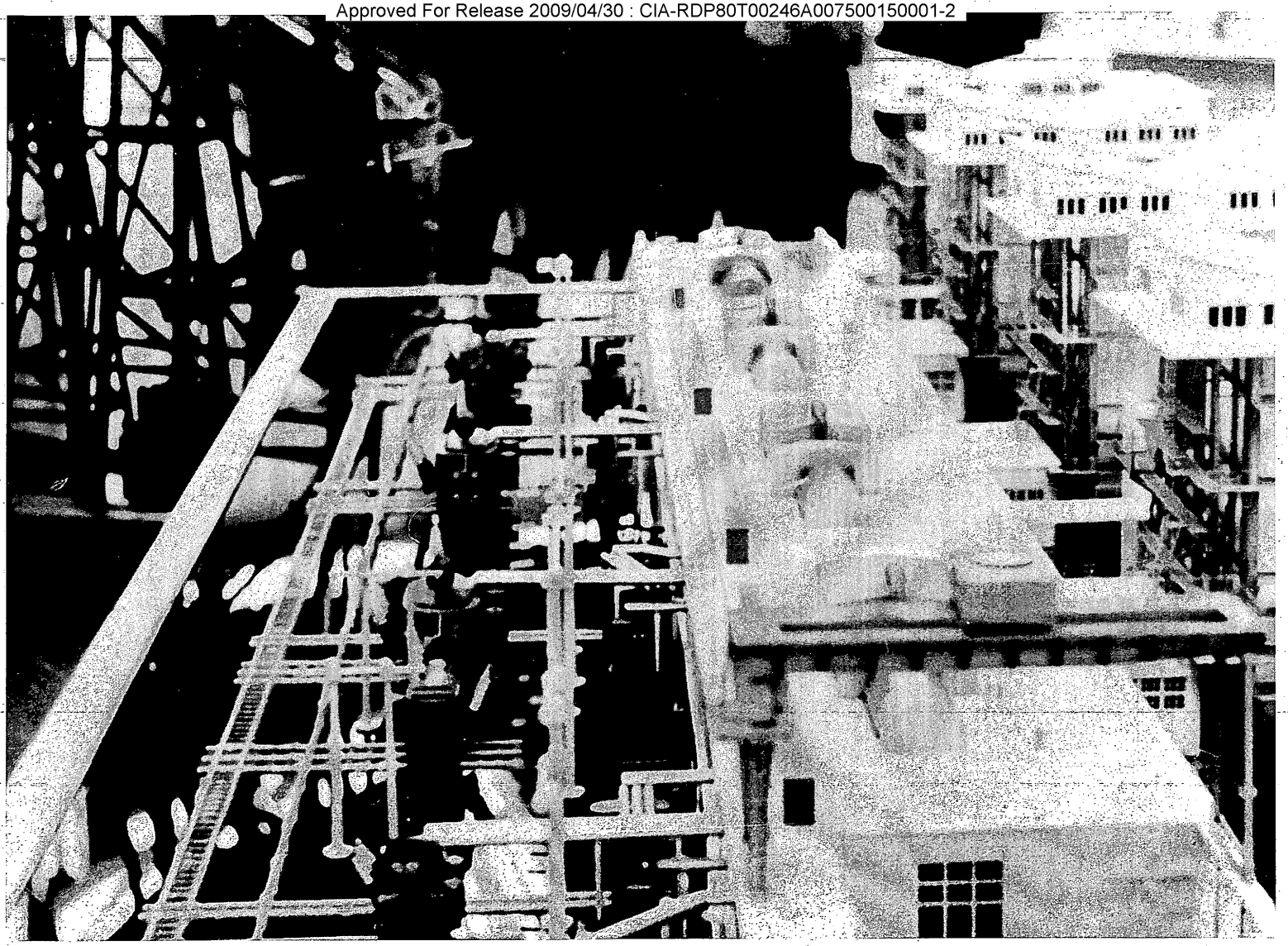

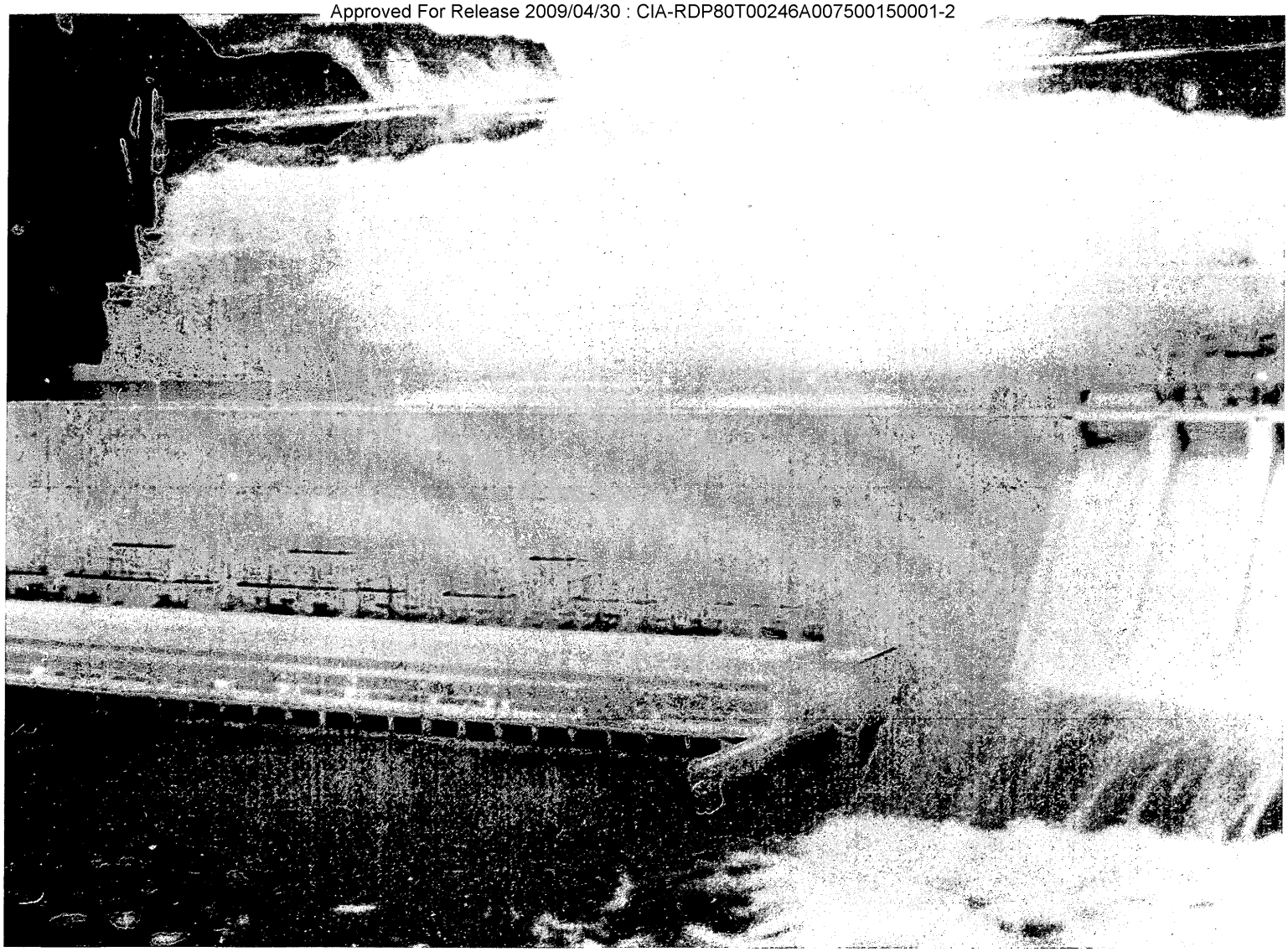

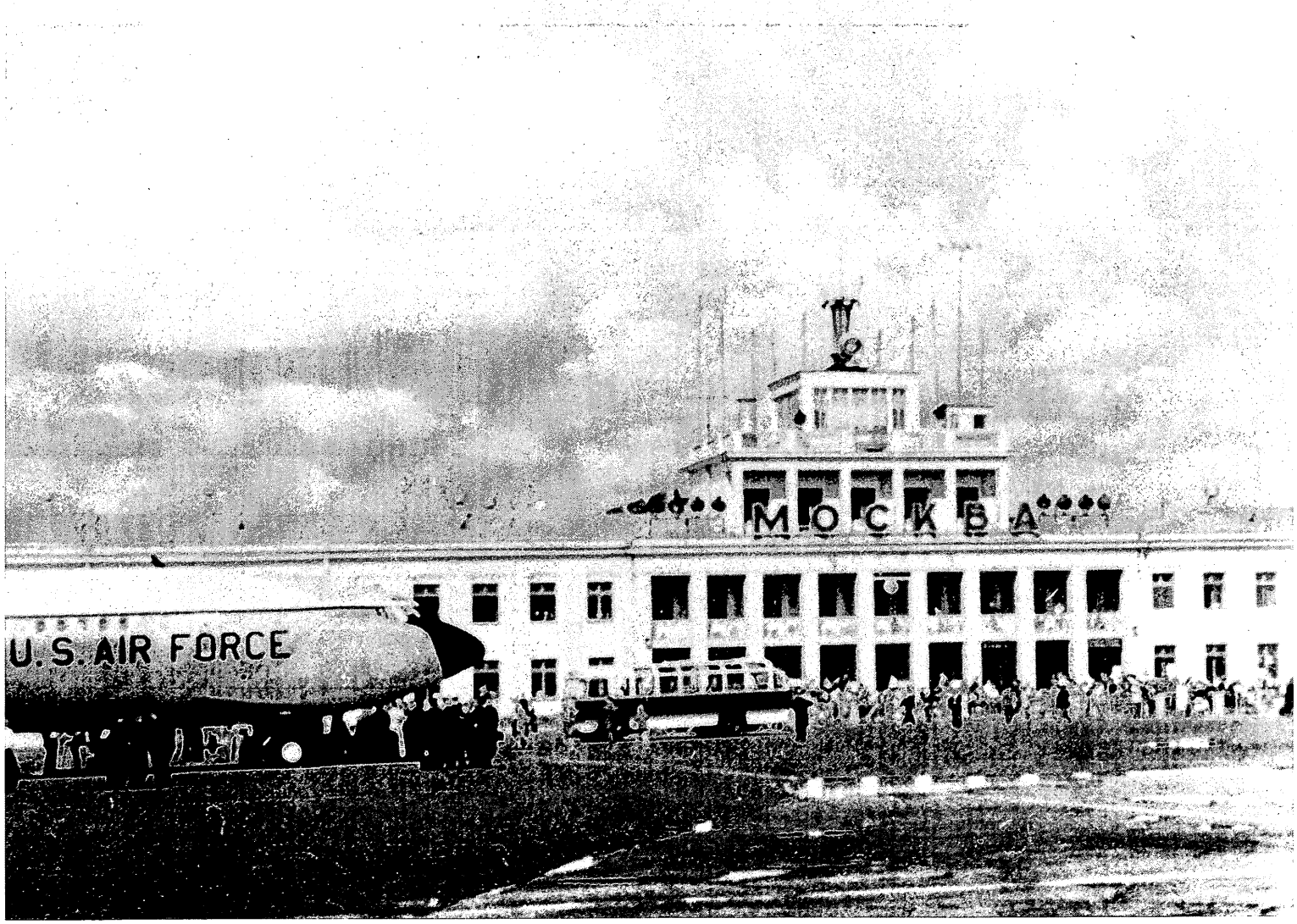

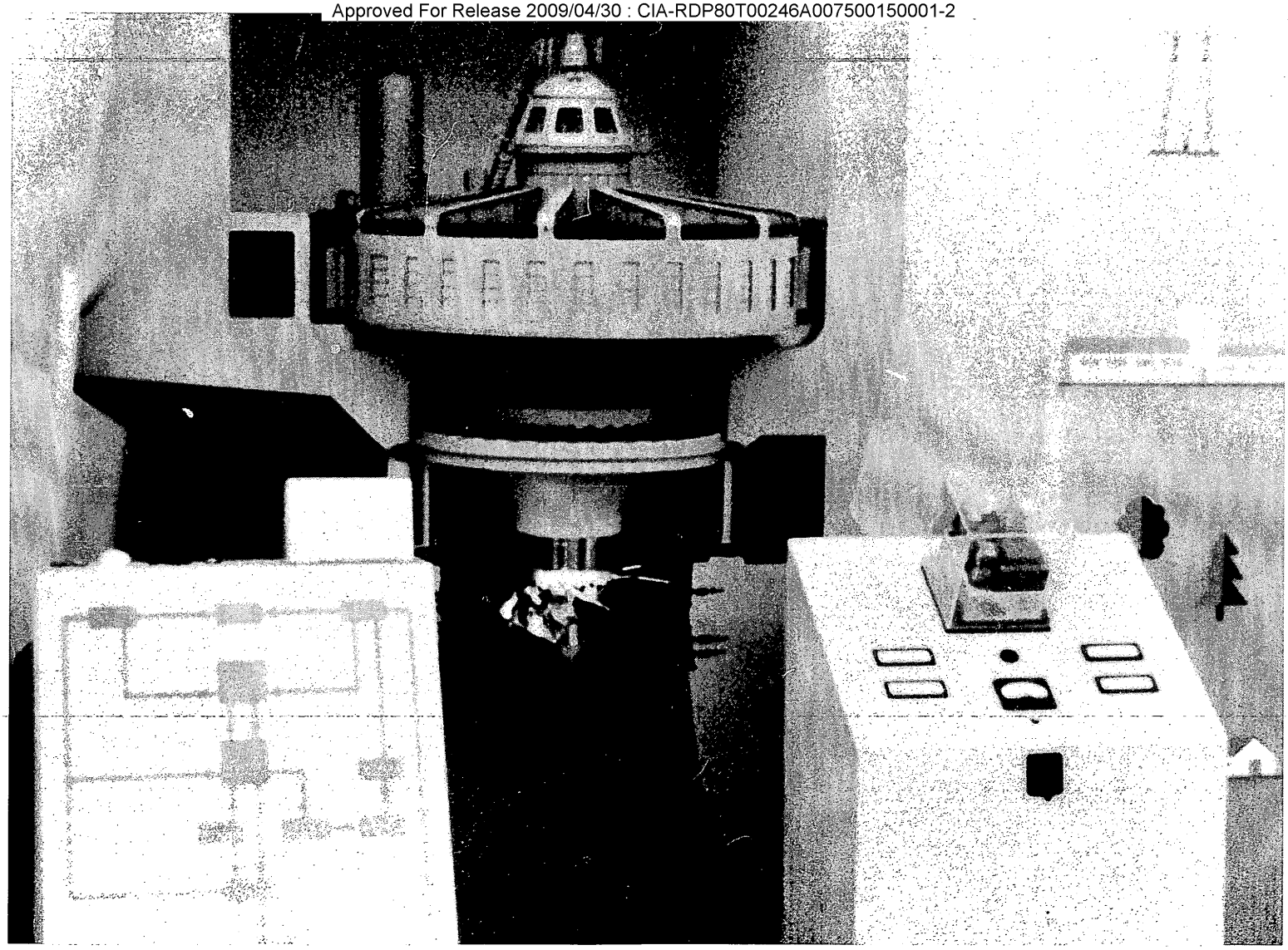

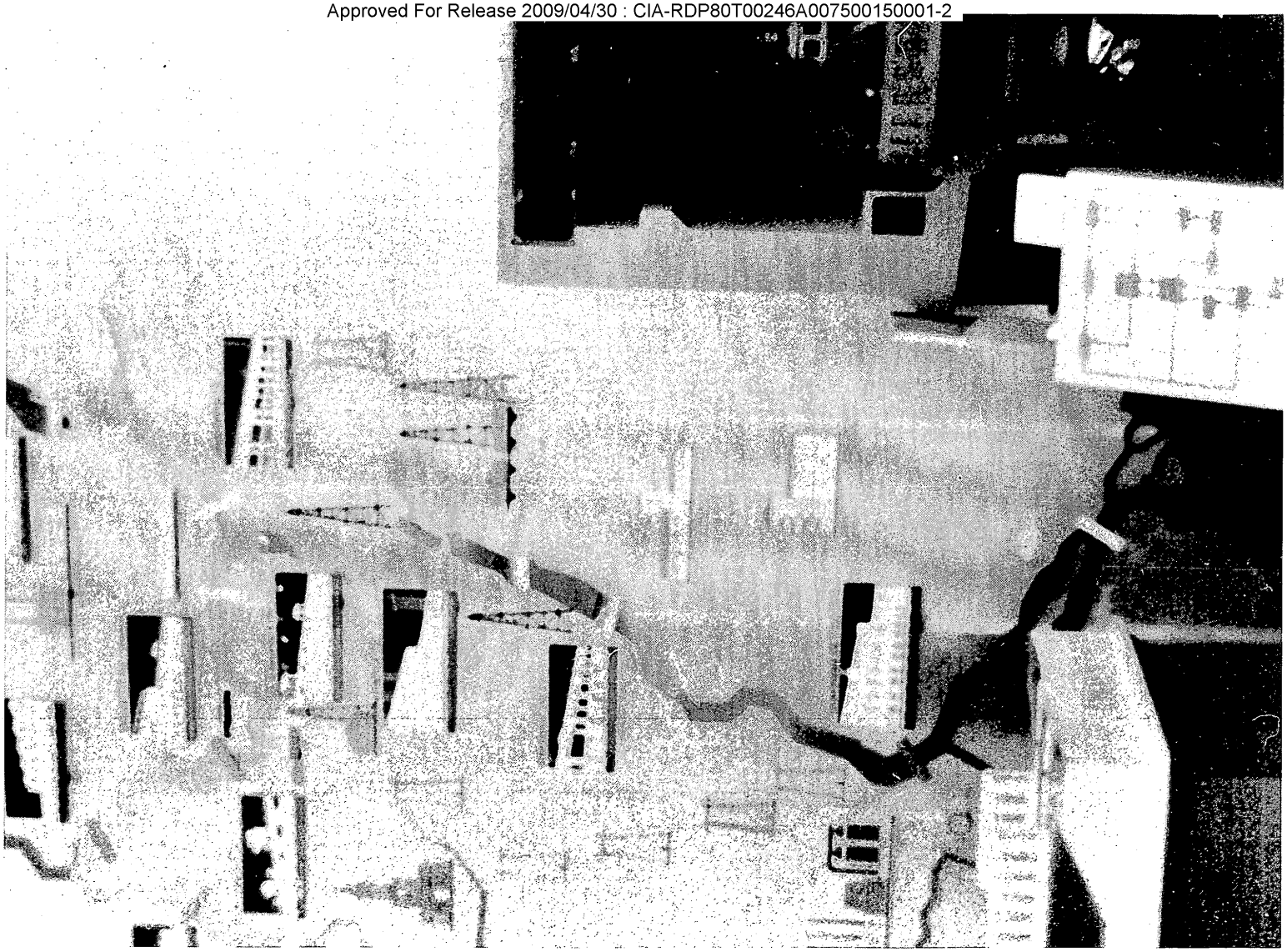

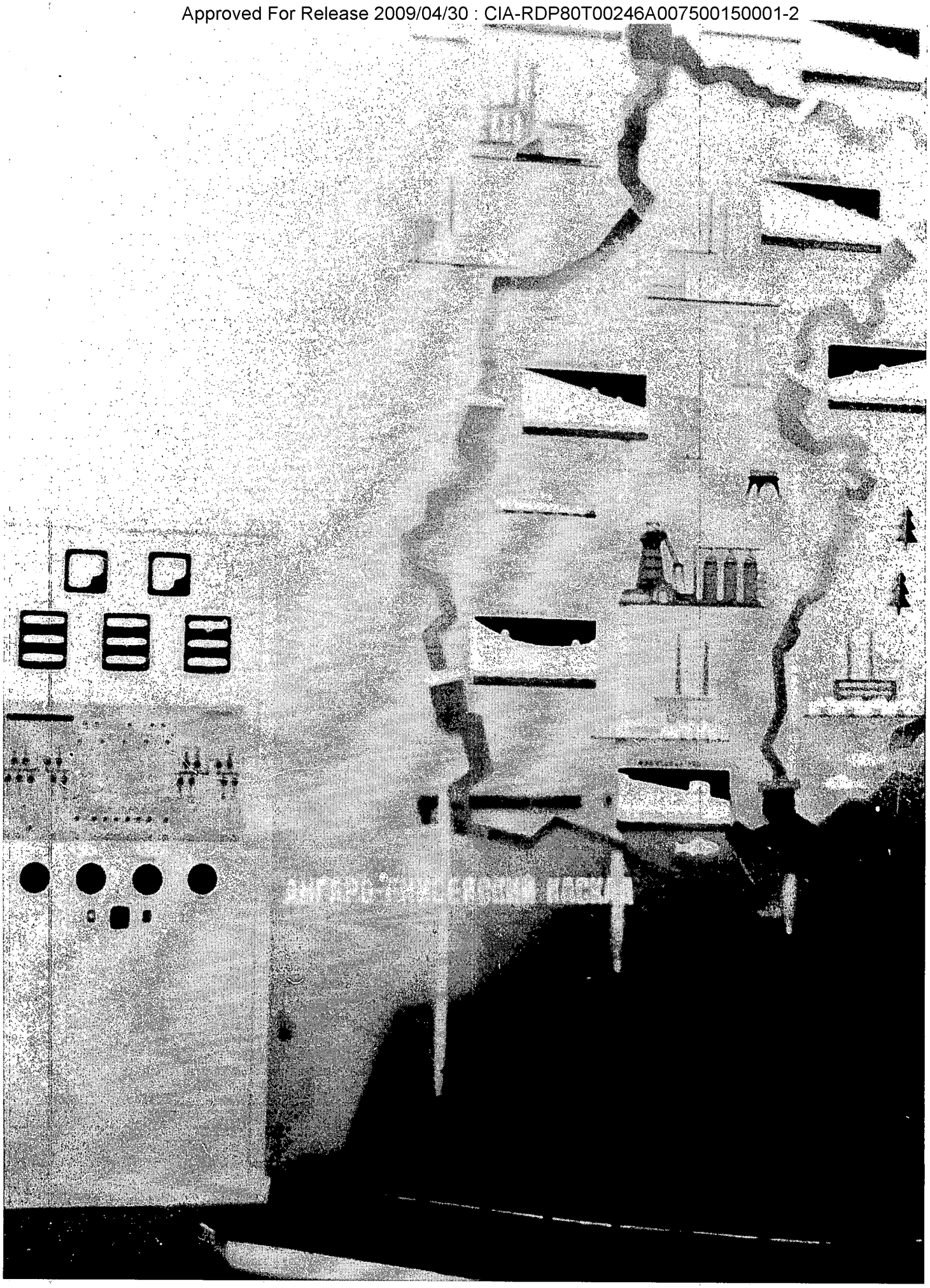

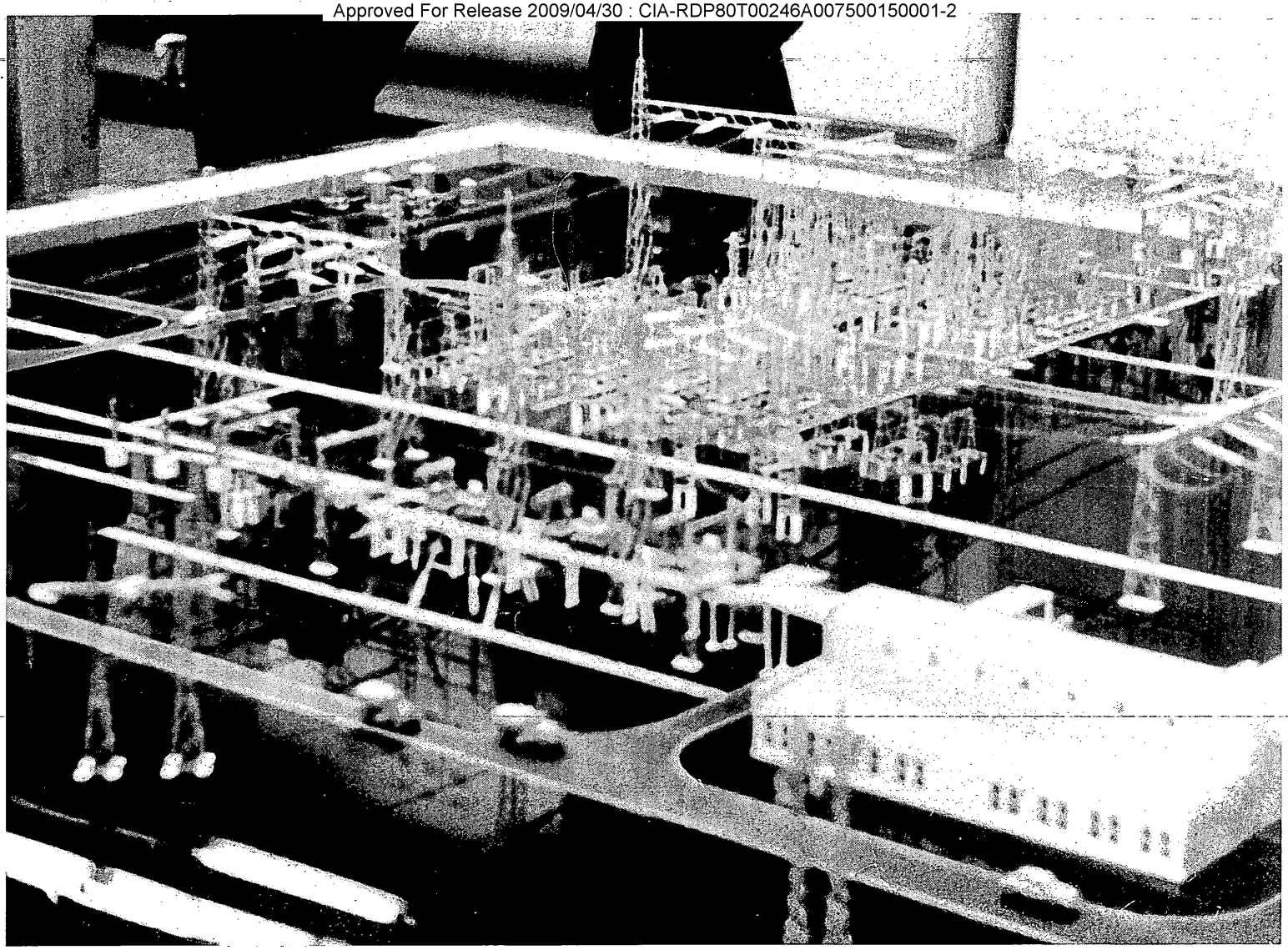

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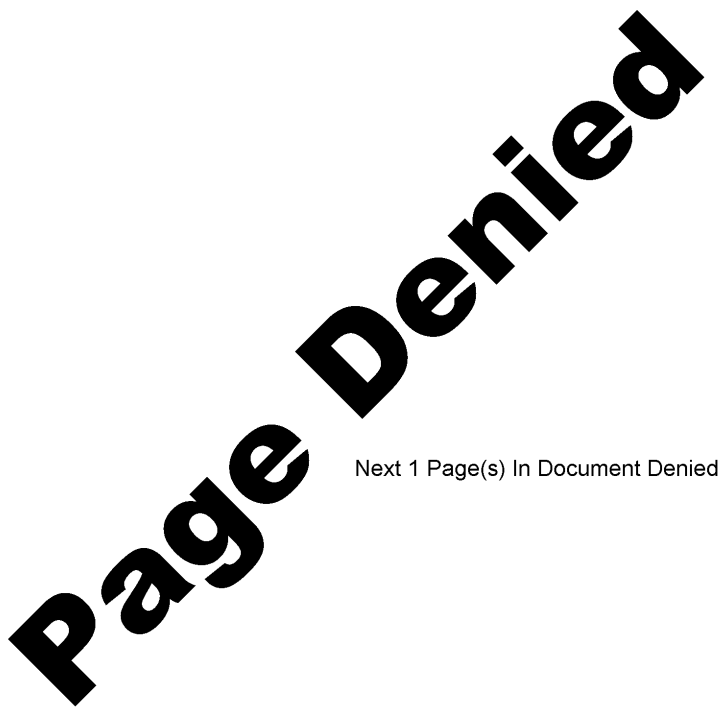

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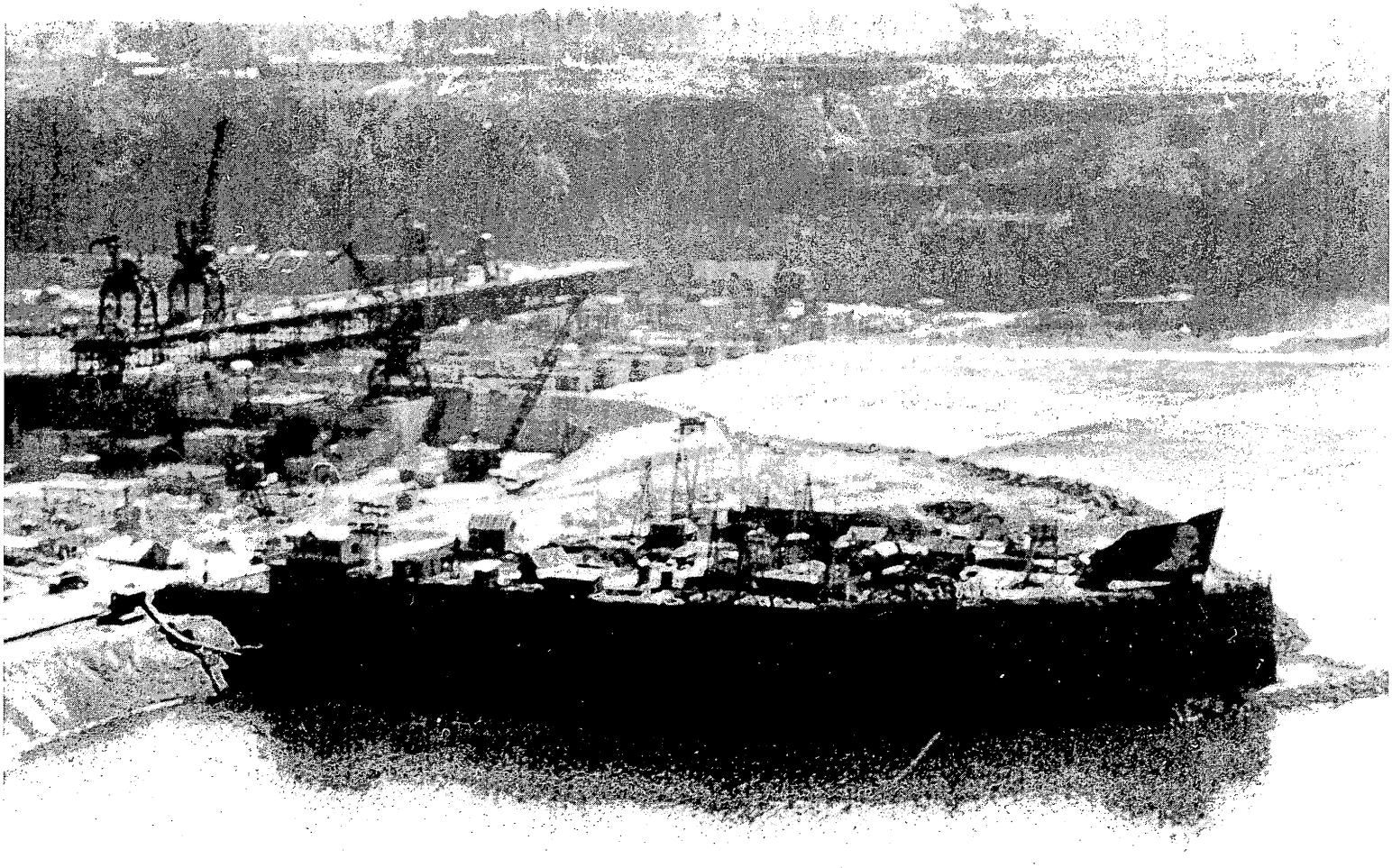

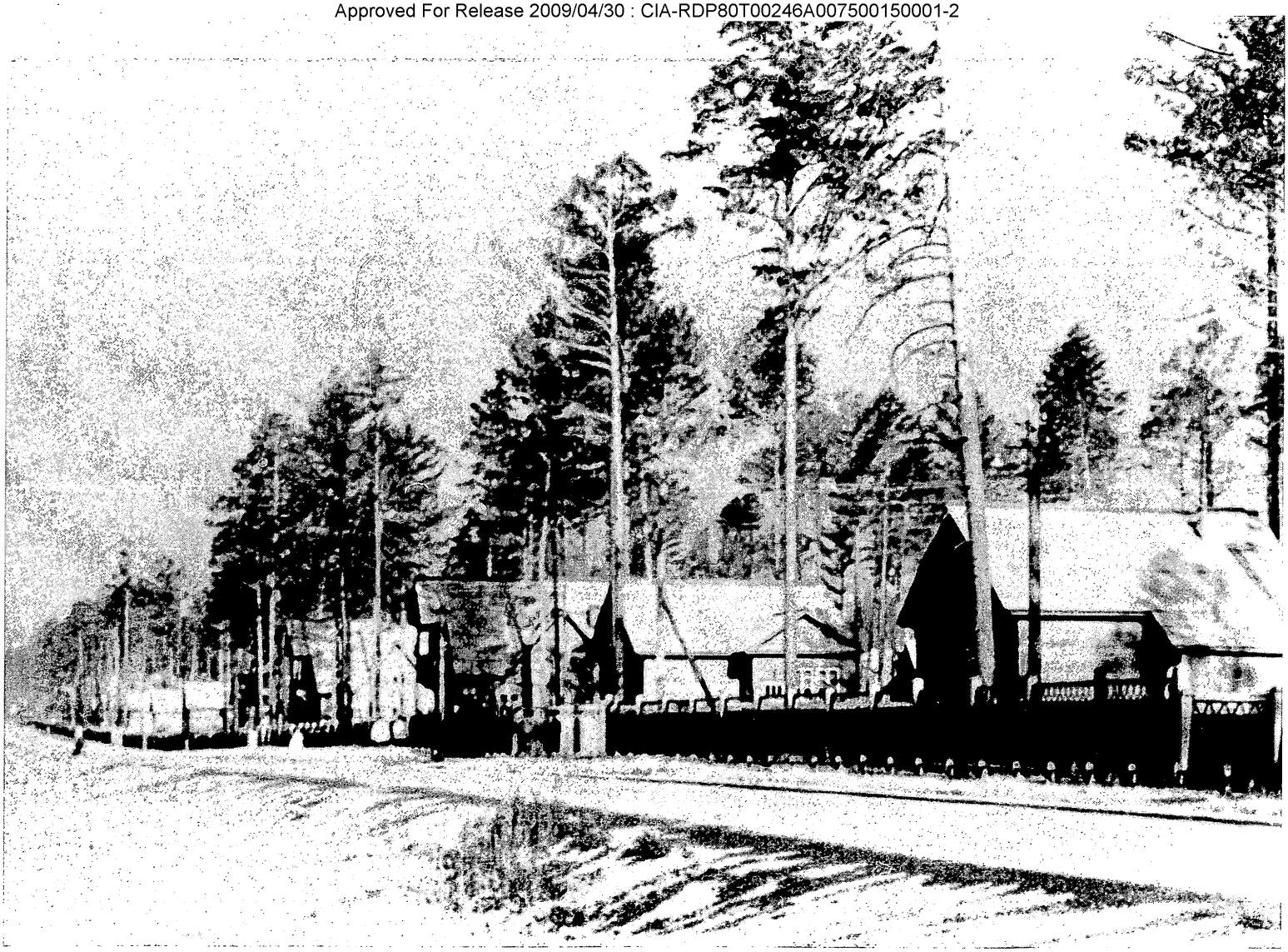

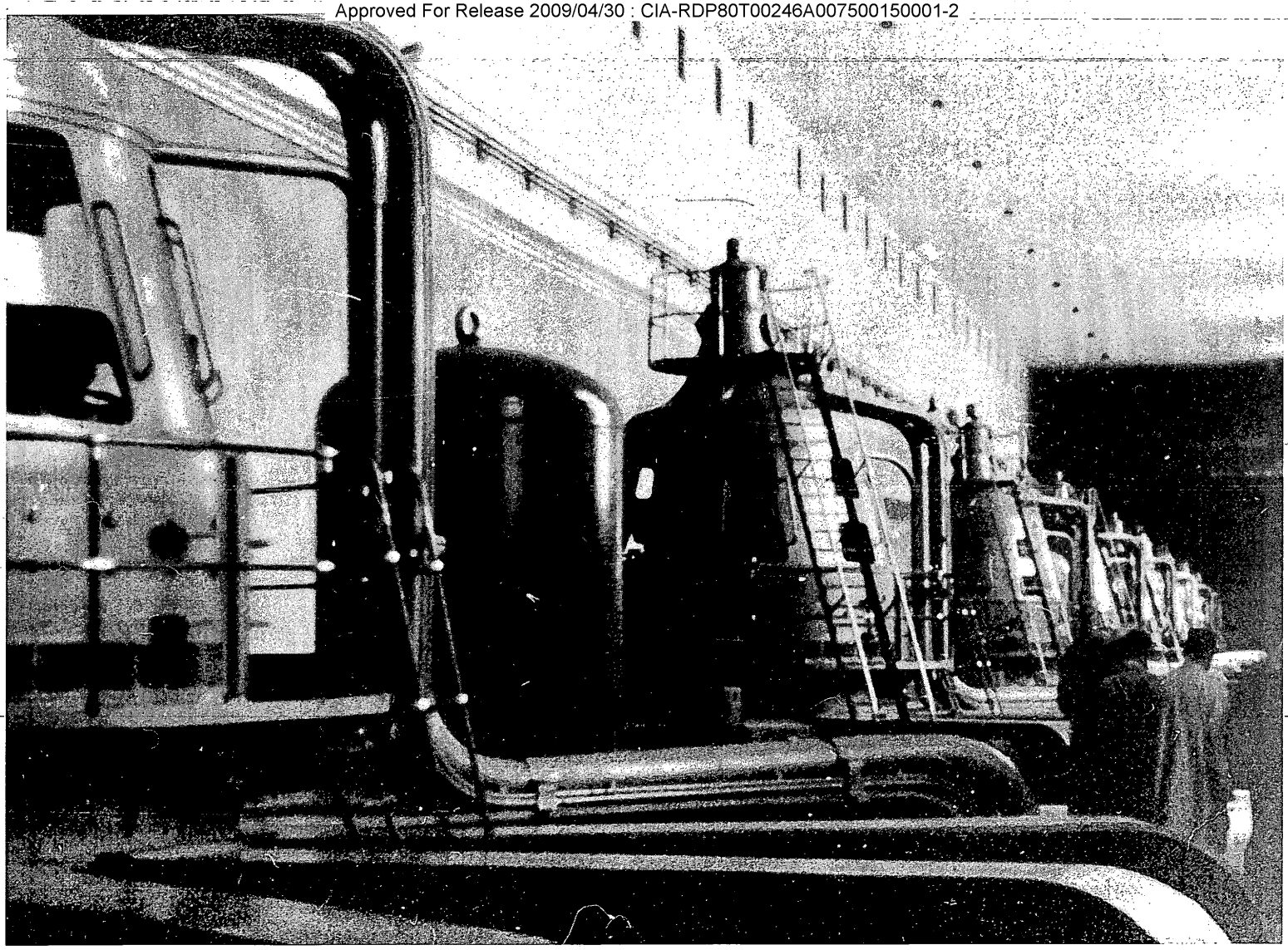

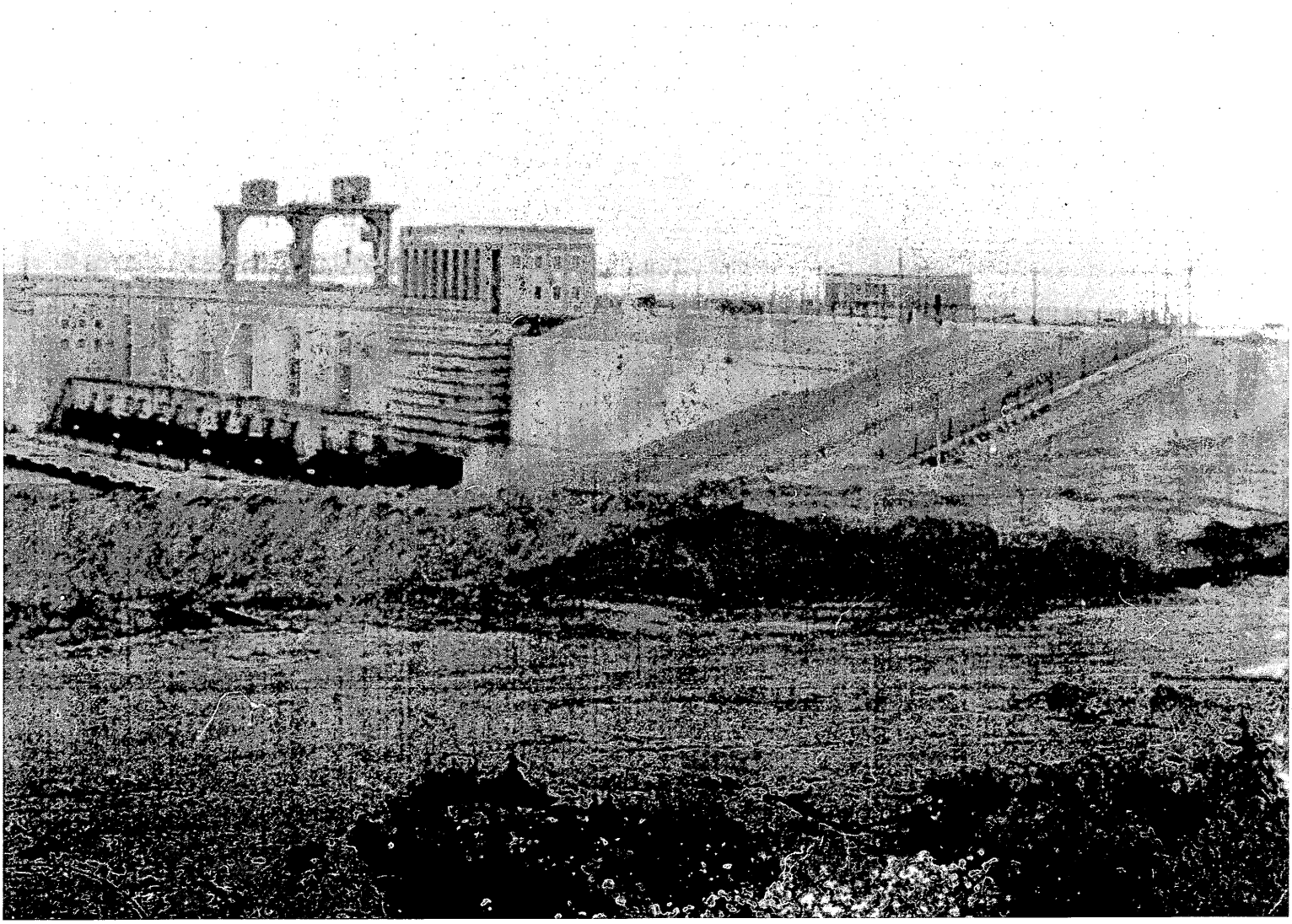

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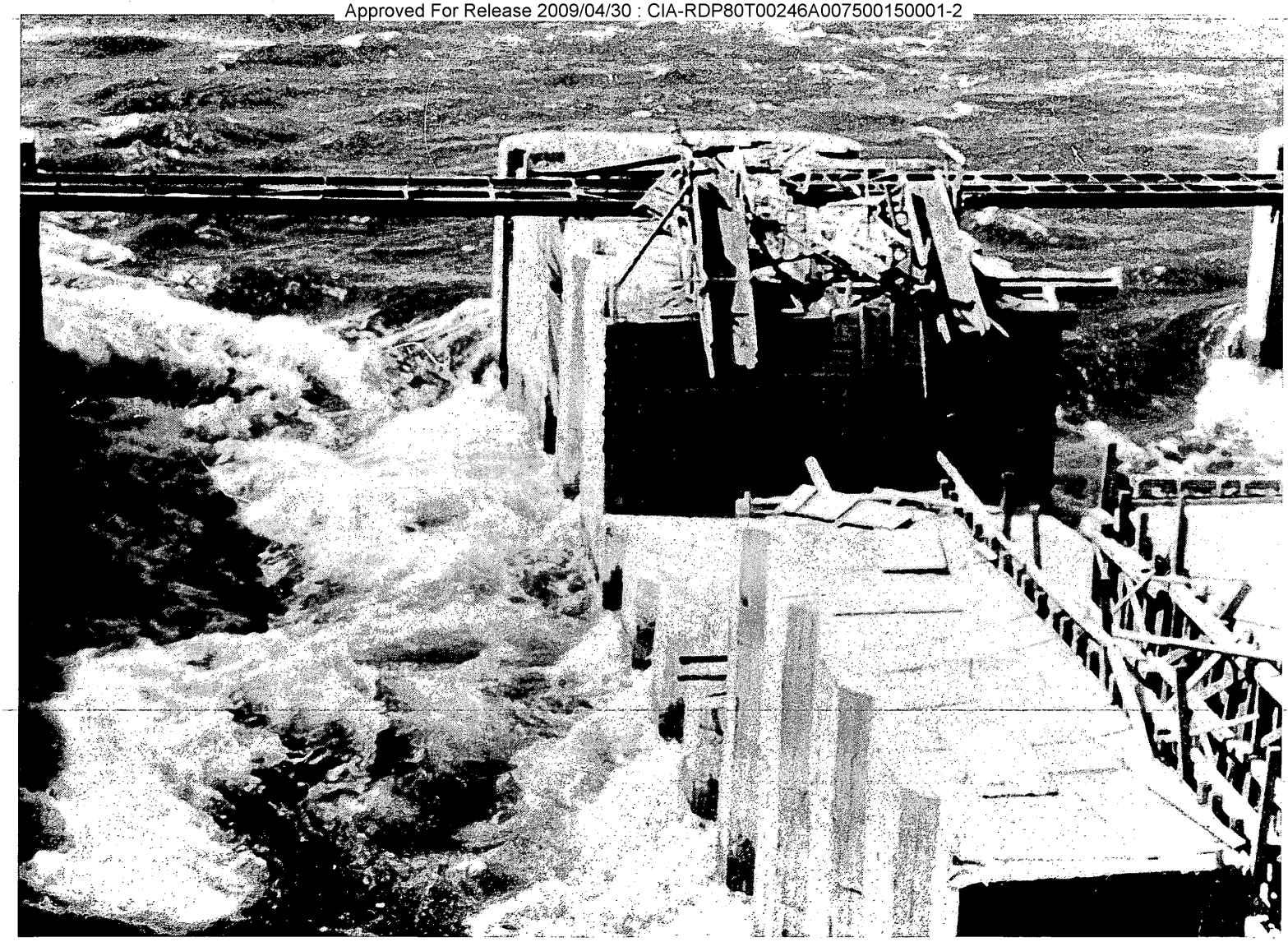

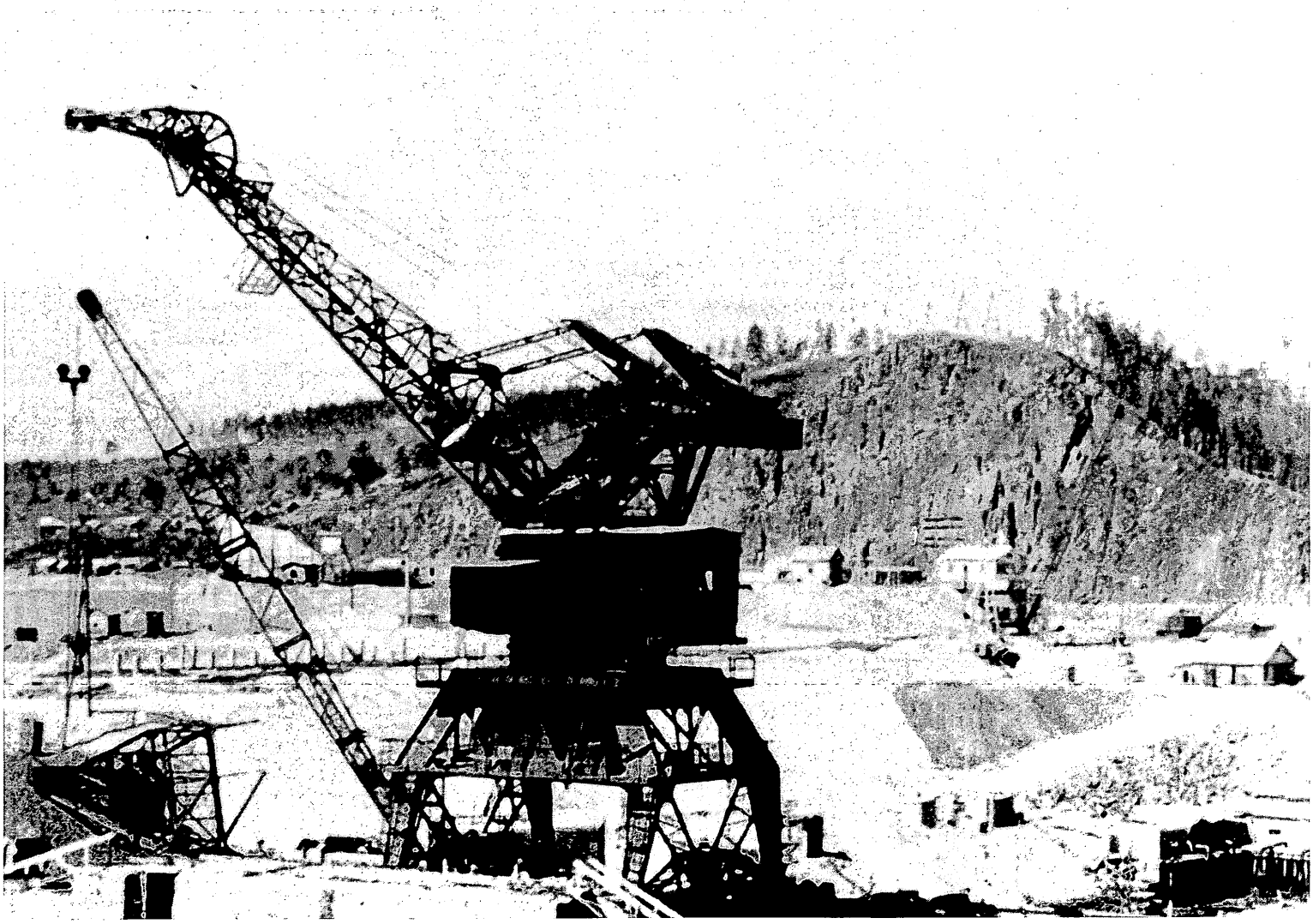

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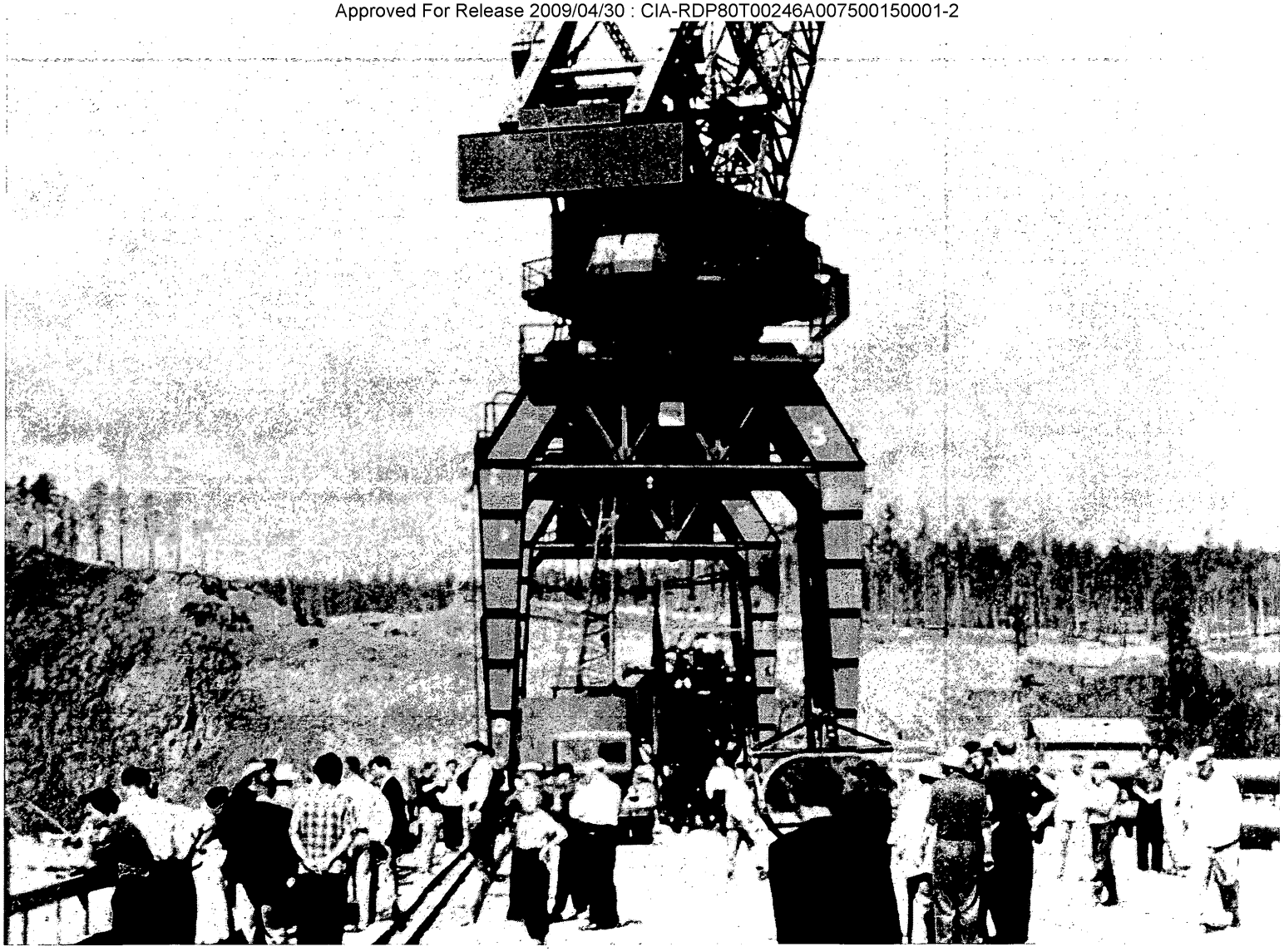

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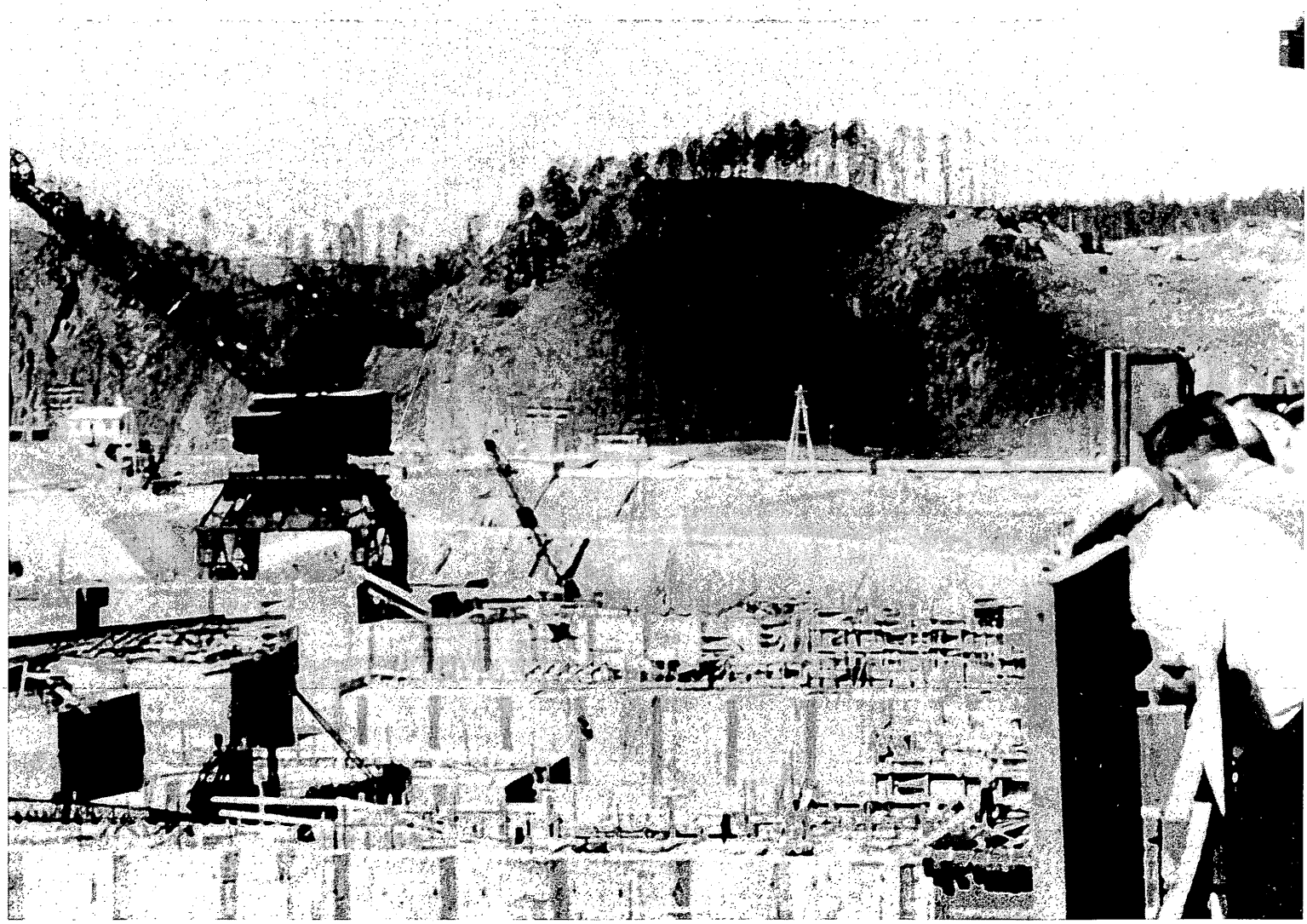

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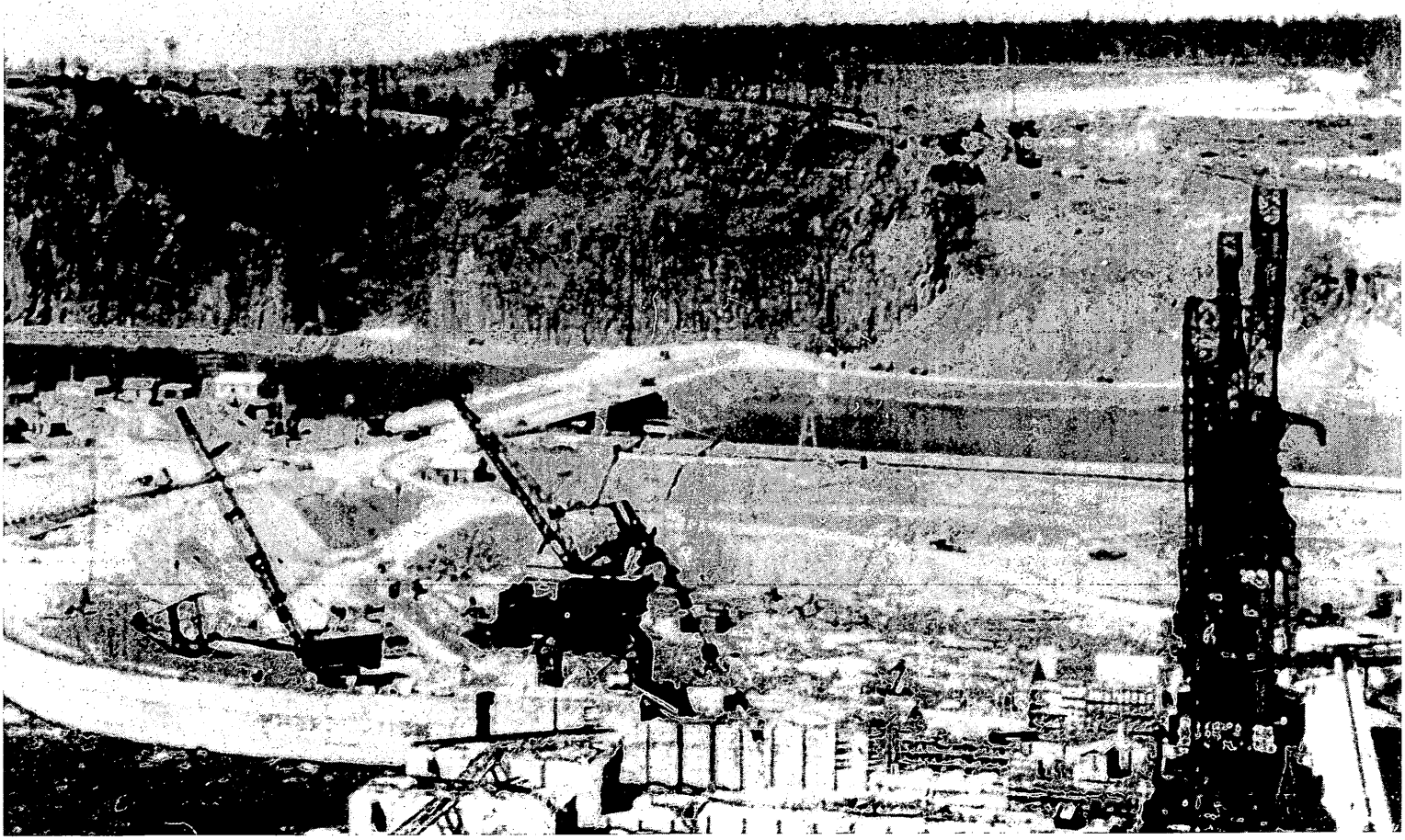

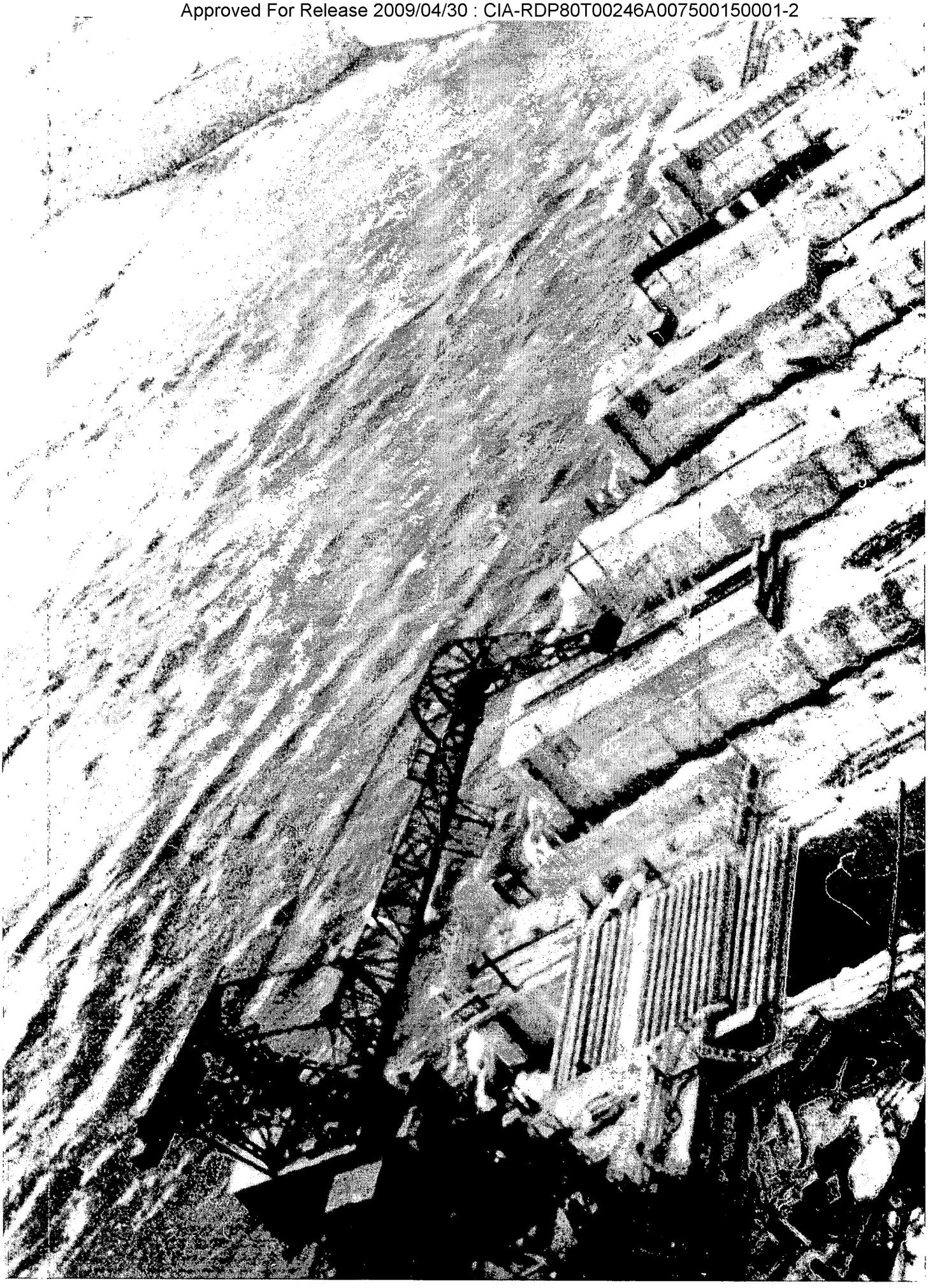

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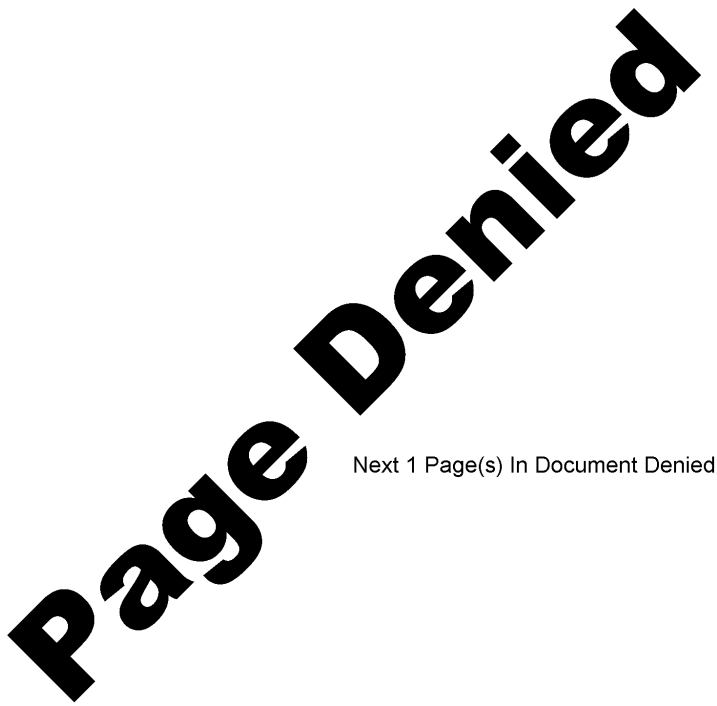

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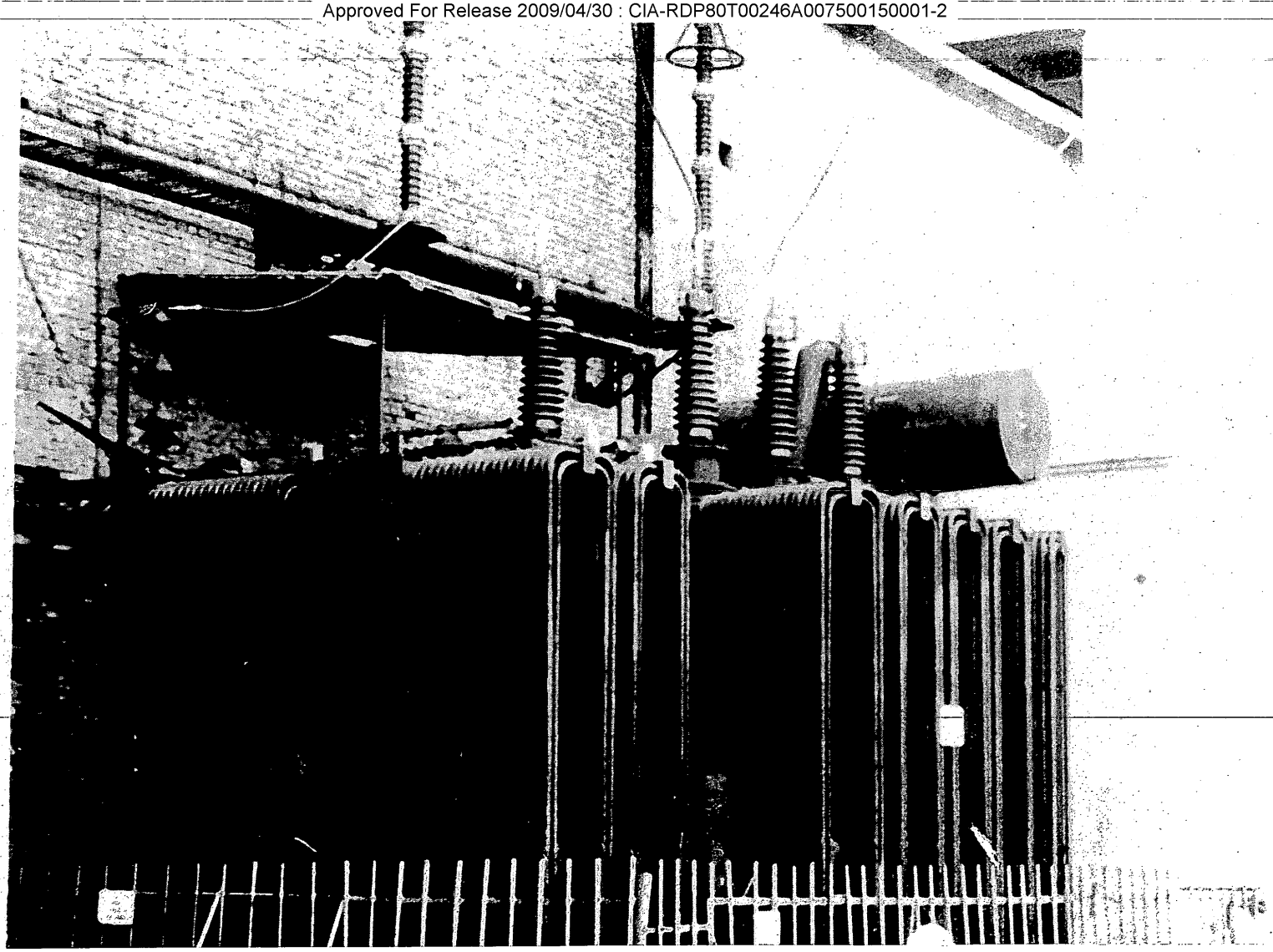

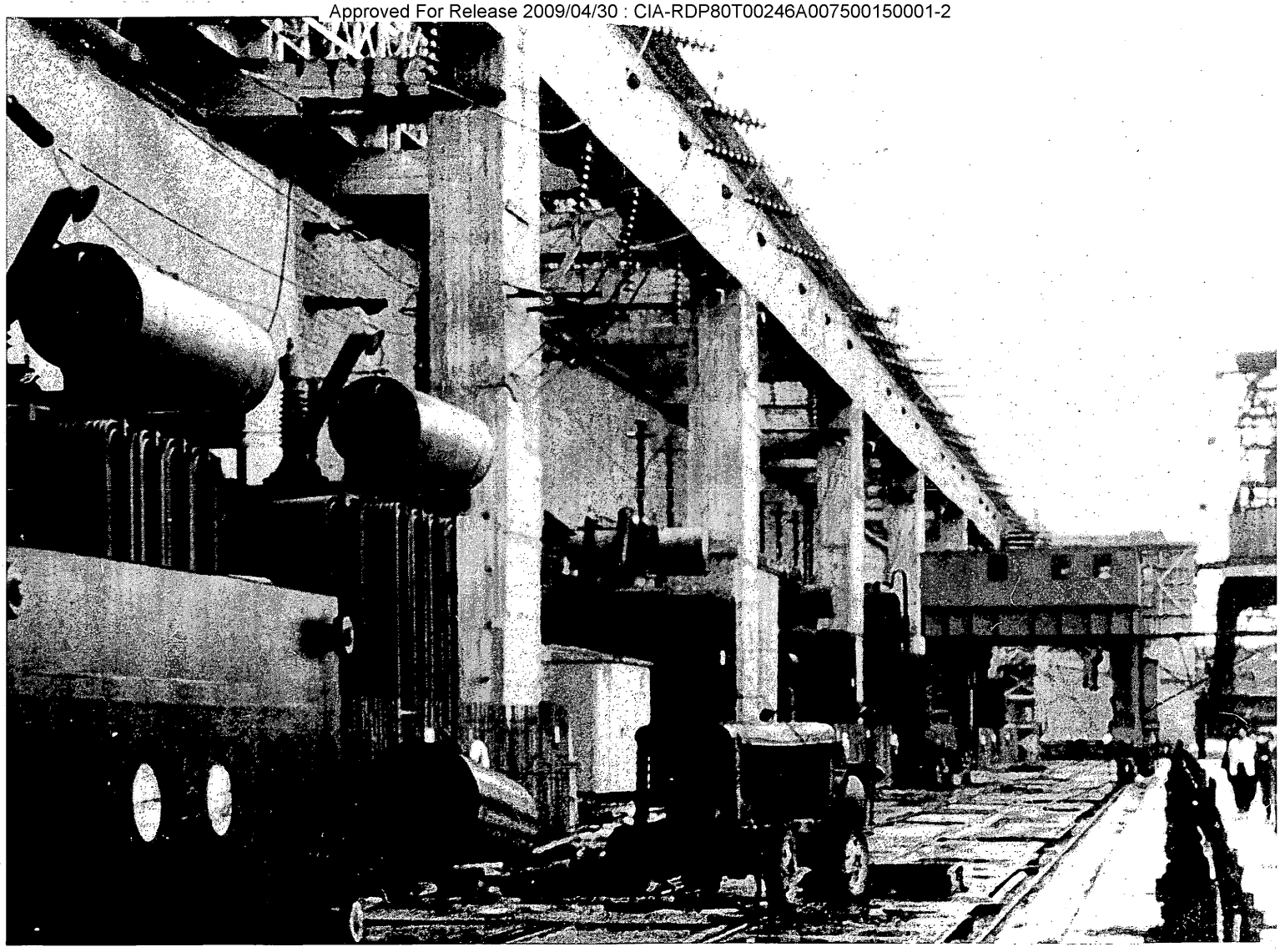

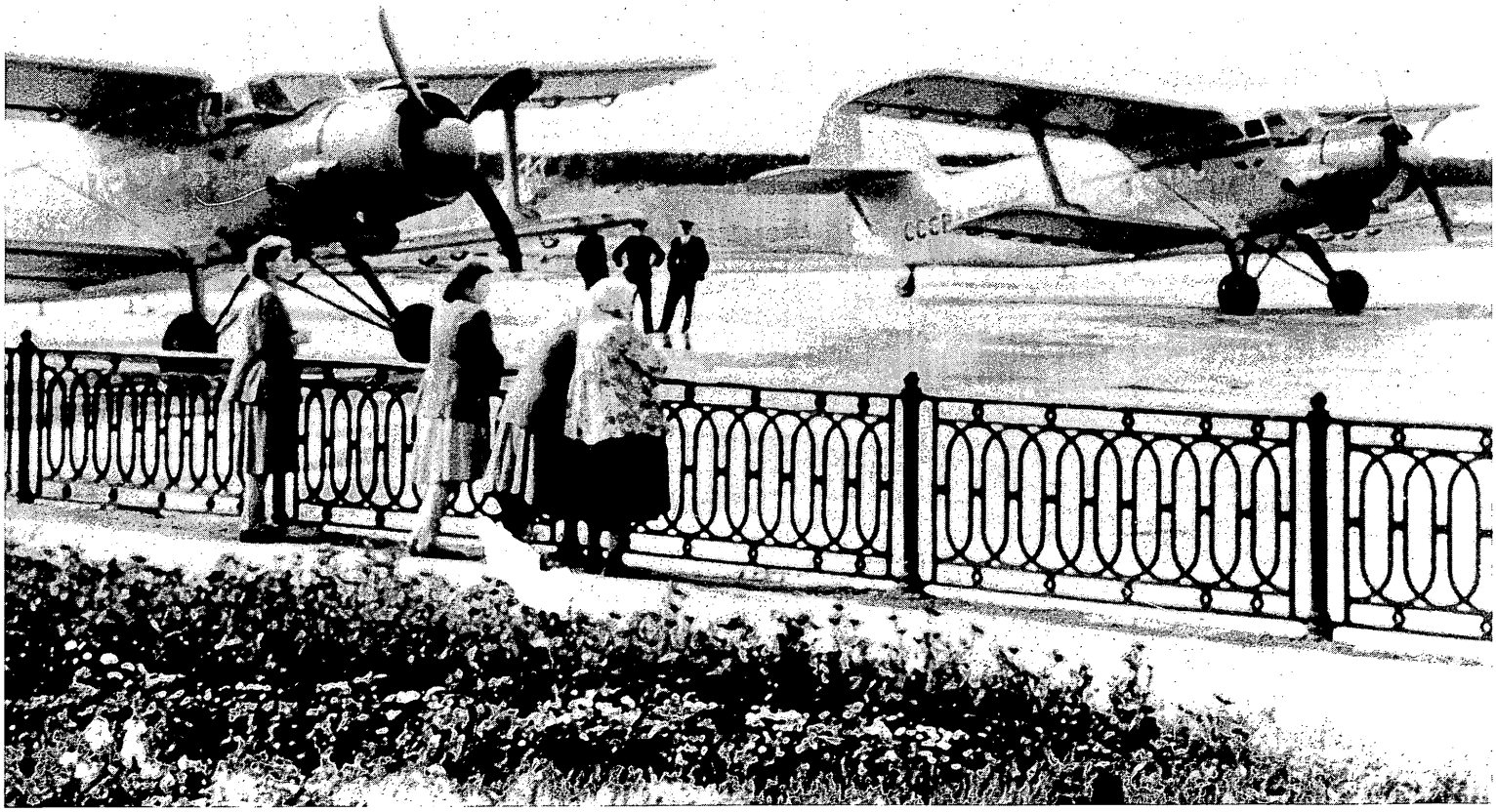

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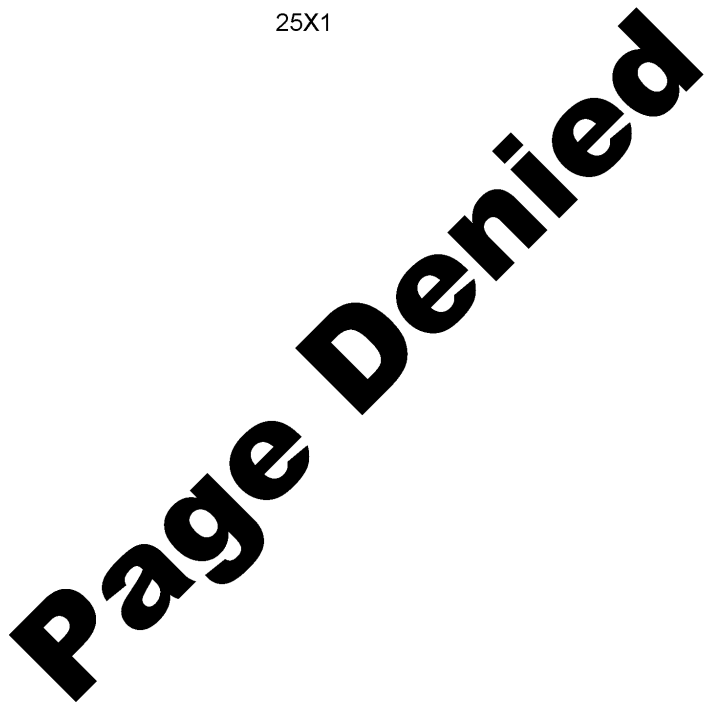

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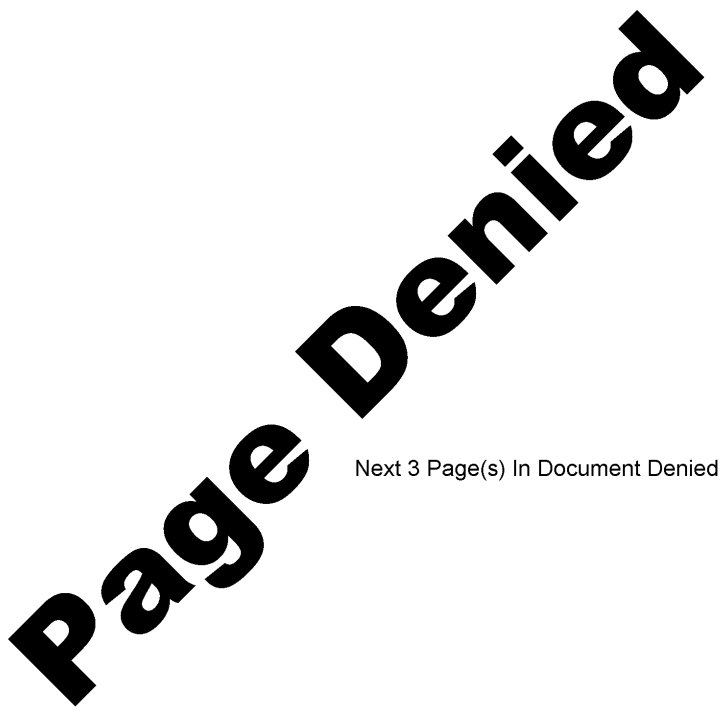

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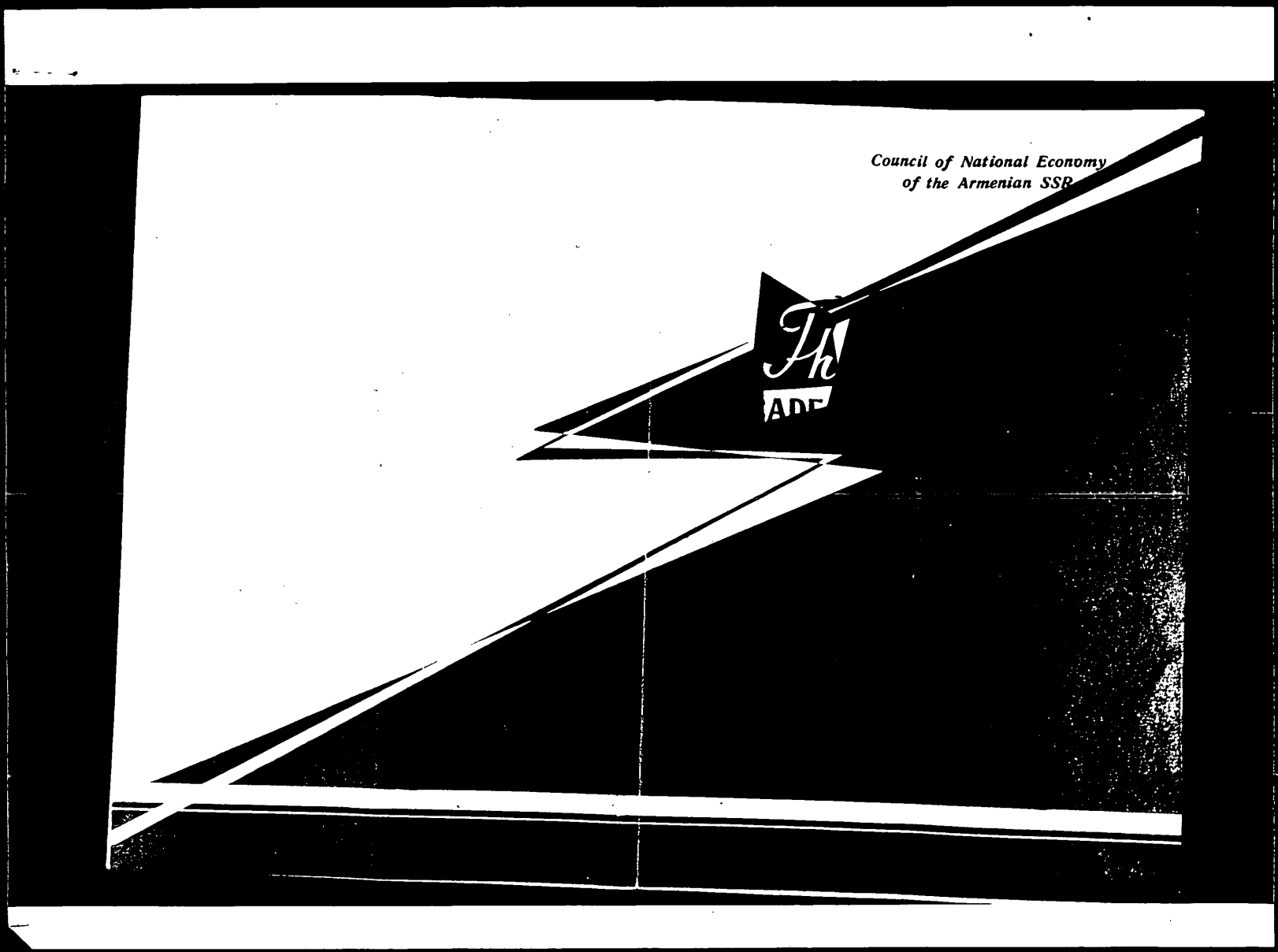

During the period of time envisaged by the seven-year plan the work on the Sevang-Razdan cascade of hydroelectric stations will be completed in the main. This is one of the most interesting hydroelectric developments as concerns the technical solution to the problem and the effectiveness of the project.

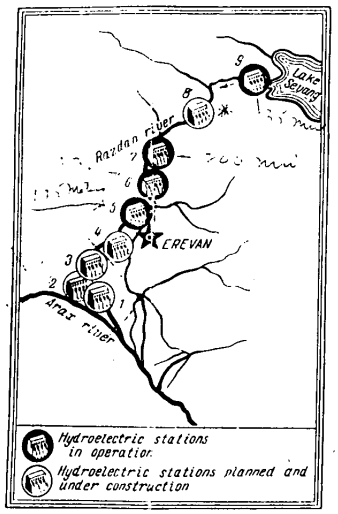

Fig. 1. Diagram of the Sevang-Razdan cascade of hydroelectric stations.

1—Noragavit; *2*—Lower Argavand; *3*—Upper Argavand; *4*—Erevan; *5*—Kanaker; *6*—Arzni; *7*—Gimnush; *8*—Atarbekyan; *9*—Sevang

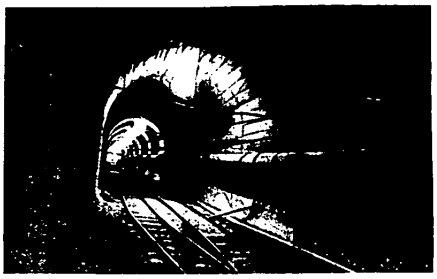

Fig. 2. Power tunnel at the Arzni hydroelectric station.

The cascade is being constructed in the Armenian Soviet Republic on the Razdan River, which emerges from Lake Sevang in the mountains.

There are two fundamental reasons why this effective cascade on the Razdan River can be created:

a) Lake Sevang has a large amount of water and acts as a natural regulating reservoir for the hydro-stations in the cascade;

b) the Razdan River drops by some 1096 m over the distance of 146 km from Lake Sevan to the Arax River.

The lake covers an area of 1116 sq km; it is 70 km long and 36 km wide on the average. The maximum depth of the lake is 99 m. The water reserve in the lake comprises 58.5 billion cu m.

Twenty eight rivers flow into Lake Sevang; their average annual flow amounts to 770 million cu.m of water. The annual precipitation onto the lake surface comprises 552 million cu m. The only river that emerges from Lake Sevang is the Razdan (which was earlier called the Zanga). Its natural run-off amounts to less than 50 million cu m of water. About the same amount of water seeps into the banks and river bottom. All of

the remaining water comprising more than 1200 million cu m evaporates from the surface of the lake.

The project for utilizing Lake Sevang and the Razdan River calls for the construction of low-level intakes in the lake, thereby increasing the run-off of the Sevang River to 1275 million cu m. As a result, the water level of the lake will diminish by an average of 55 cm per year, and after fifty years, the area of the lake will be 6 to 7 times smaller. Thus the evaporation from its surface will sharply contract. The inflow and outflow of water in the lake balance out approximately.

The waters from the Sevang are not only employed for power production purposes; after they pass the turbines at the hydroelectric station, they will be directed in part for irrigating the fertile land in the Ararat valley. At present, about 10% of the run-off of the Razdan River is used for this purpose.

Nine hydroelectric stations are planned on the Razdan River, which will use up a total head of 938 m.

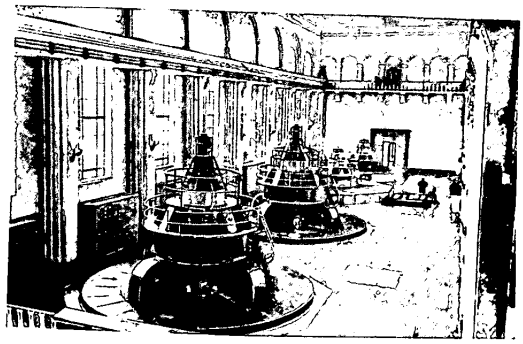

Fig. 3. Machine hall at the Giumush hydroelectric station.

All of the hydroelectric stations in the cascade are designed as derivational developments containing water intakes, headrace and tailrace canals and tunnels as well as power-station structures (penstocks, the power-house etc.).

The head station in the cascade, the Sevang or Lake hydrostation with its underground machine hall was put into service in 1949. This hydroelectric plant is noteable in that it may continue to operate even when the water level of Lake Sevang changes in time.

The second stage of development is the Atarbekyan hydroelectric station. This station will be put into service at full capacity in 1959.

The next stage of development is entailed with the largest hydroelectric station in the cascade, the Gumush station; it was put into operation at full capacity in 1953. The last turbine at the Arzni hydroelectric station (the fourth stage of development) was put into operation in March 1957. The Arzni hydroelectric plant has an underground machine hall, just as on the Sevang station.

The fifth stage of the cascade, the Kanaker hydroelectric station was erected even before 1911.

Construction work on the next stage of the development, the Erevan hydroelectric station, was started in 1957. This station will be put into operation in 1960.

At present projects are being worked out for the hydroelectric stations at the downstream stages of the cascade (the seventh, eighth and ninth in number), the Upper Argavand, the Lower Argavand and the Noragavit stations.